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ABSTRACT

The first of two volumes, this document describes the planning process of a 5-year plan for meeting the telecommunications and automatic data processing (ADP) needs of the federal government, examines the planning efforts of several typical agencies, and explores issues involved in managing new technology as it evolves. For each agency, information is included on expenditures for data processing and telecommunications activities, the purpose for the expenditure, changes in the inventory of federal computers, and the personnel resources used to operate and maintain these systems. In-depth descriptions of seven representative agencies that have instituted agency-wide planning mechanisms to manage their information resources include a description of the agency, its planning approach, overview of the structure and content of the plan, and its evaluation. Agencies include the Federal Aviation Administration, Federal Bureau of Investigation, General Services Administration (GSA), Department of the Interior, Department of Justice, Social Security Administration, and Department of State. The report concludes with a description of a methodology developed by GSA's Information Resources Management (IRM) Planning Support Program; the GSA self-assessment checklist for evaluating the planning process, the plan, its implementation and the maintenance process; and an interim report on the management implications of the new technologies. (LMM)

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A Five-Year Plan for Meeting the Automatic Data Processing and Telecommunications Needs of the Federal Government

Volume 1: Planning Strategies

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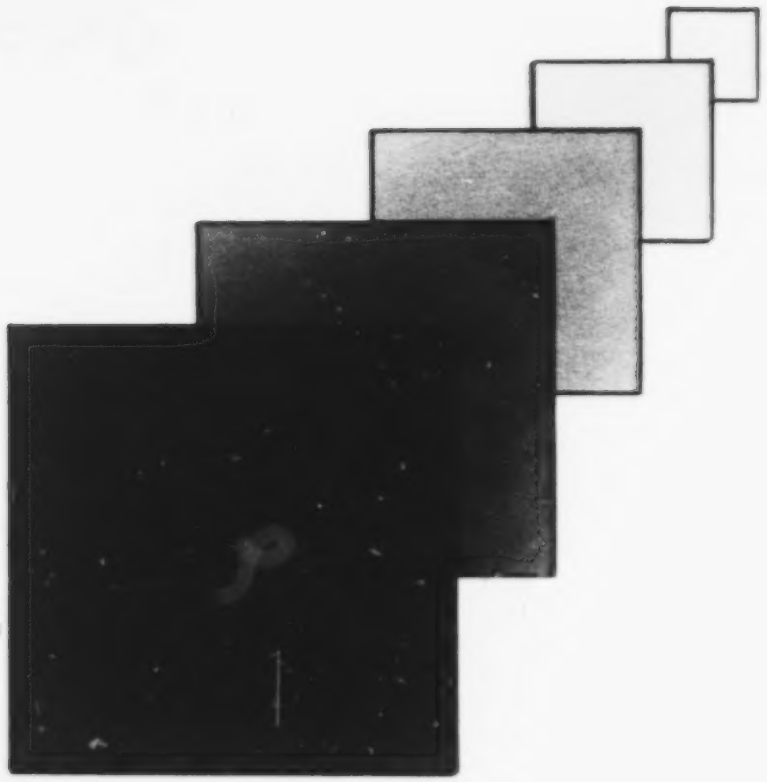

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April 1984

A Five-Year Plan for Meeting the
Automatic Data Processing and Telecommunications
Needs of the Federal Government

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FOREWORD

This document is the second Five-Year ADP and Telecommunications plan issued by the Office of Management and Budget (OMB). It was produced to meet a specific requirement of the Paperwork Reduction Act of 1980. Section 3505(3) (E) of that Act requires OMB to "develop, in consultation with the Administrator of General Services, a five-year plan for meeting the automatic data processing and telecommunications needs of the Federal Government."

This year's plan, like last year's is a joint effort of the Office of Information Resources Management of the General Services Administration, the Institute for Computer Sciences and Technology of the Commerce Department's National Bureau of Standards, and the Office of Information and Regulatory Affairs of the Office of Management and Budget.

The structure and content of the Plan continue to evolve. Last year's plan was designed to serve as a general resource document portraying technology trends and exploring issues of interest in information technology. This year's plan focuses more specifically on the planning process itself. It describes the process and examines the planning efforts of several typical agencies, and also explores some concerns for managing the new technology as it evolves.

Volume II of the plan contains the information technology acquisition plans of the Federal government, broken out by agency and component.

EXECUTIVE SUMMARY

Federal agencies continue to spend large amounts to acquire, operate, and maintain information technology systems. For the years FY 1983 to FY 1985, expenditures are expected to grow by $3.5 billion dollars to a total of $13.9 billion. Indeed, the Federal information technology systems budget is projected to increase at a rate faster than that of the overall Federal budget.

Agencies' capital investments are expected to increase significantly from $1.4 billion in FY 1983 to $2.6 billion in FY 1985. Similarly, obligations for commercial ADP and telecommunications services are increasing rapidly. In FY 1983, $4.9 billion of the information technology budget was spent in commercial services. In FY 1985, that is expected to grow to $6.4 billion. Almost half of the information technology budget is allocated to commercial services.

The Federal government continues to buy more computers than it leases. In FY 1983, 88.8% of the large CPUs in use were government owned. At the same time, the average length of time in service for Federal computers is decreasing. At the end of FY 1979, it was 7.3 years; at the end of FY 1983, 6.6 years.

With expenditures at these levels, and with agencies becoming increasingly dependent on information technology to accomplish their basic missions, it is essential that these technologies be acquired and used in a rational way. Planning processes must be capable of projecting mission/program needs to take full advantage of the new technologies.

In many cases, however, agency planning processes have not achieved such results. The principal processes for planning have been the fiscal budget process and, for systems that require significant new hardware, the procurement process. Because budgeting and procurement occur so late in the system planning cycle, these processes are less effective in shaping agency information technology investment decisions.

Moreover, incentives are distorted. While the policy goal is to achieve the least overall system life cost for a given application, the imperatives tend to work against this goal. Thus, there are greater incentives to hold down outlays in the present year, to buy in and make it up next year; or, if money is actually available, to spend it.

As a consequence, all too often systems are developed incrementally without regard for longer term considerations or; they are patched and fixed to meet short term needs. The total information needs of the organization are seldom addressed in a comprehensive way.

This is not to suggest that central review is the answer to all current distortions in the planning process. Successful enterprises, public and private, have long recognized that information resources management, like human resources management, must be subordinate to, and supportive of, program or mission goals and strategies. At the same time, it is important to ensure that Federal information technology investments are economically sound by:

- o Improving the quality of agency planning;
- o Tying the decisions about agency technology investments more closely to the fiscal budget process; and,
- o Eliminating biasing features of our current management systems that tend to distort investment decision-making.

The Paperwork Reduction Act of 1980 clearly envisions a more significant role for information technology planning. Specifically, it requires that OMB (1) publish a five-year government-wide ADP and telecommunications plan; (2) review and coordinate agency proposals for the acquisition and use of information technology; and (3) promote use of the technology to improve governmental efficiency and effectiveness.

In devising a strategy for planning that addresses both the statutory requirements and the needs outlined above, several key factors must be kept in mind:

- o The planning must be program based. It must be driven by and be subordinate to mission objectives;
- o The process must strengthen agency control. Central oversight processes are not a substitute for effective agency management;
- o Major decisions must be identified sufficiently early in the process to allow for effective review and oversight when strategic decisions are being considered; and,
- o The process must provide a mechanism for identifying multi-agency and government-wide systems where more active central management agency participation may be appropriate to take advantage of opportunities for consolidation and sharing.

The objectives for a government-wide planning process, then, are simple:

- o Develop and institutionalize program-based planning tied to the fiscal budget under agency control; and,

- o Assure that sufficient information is available to central policy and oversight agencies to identify major issues, monitor compliance with Federal policies, and surface cross-cutting systems where more active, centralized planning and management may be appropriate.

The approach to developing this process is equally straightforward.

In April 1983, OMB, GSA and the Department of Commerce's, Institute for Computer Sciences and Technology, issued the first government-wide five year ADP and telecommunications plan. That document was less a comprehensive plan than a compilation of planning information designed (1) to assist agencies in preparing their plans; and (2) to inform equipment and services vendors about potential Federal marketing opportunities.

In July 1983, OMB asked agencies to provide data on proposed investments in administrative and management systems,(OMB Bulletin 83-18). This call and the ensuing analysis during the FY 1985 budget review were designed to identify unwarranted duplication in agency support systems and to streamline processes for meeting central agency information needs.

In March 1984, through OMB Bulletin No. 84-9, OMB asked agencies to provide copies of their current plans, and lists of major systems. The purpose of this request was two-fold:

- o To identify major systems investment decisions that need to be examined as part of the budget process; and,

- o To assess the state of agency planning.

This initial request for comprehensive planning data deliberately allowed considerable flexibility in agency responses. The Paperwork Reduction Act of 1980 requires each agency to maintain an inventory of its "major information systems." Since the term, "major information systems," is not defined, for the initial request it was thought that it would be most useful to get the agencies views on what they considered to be their major systems.

In April 1984, OMB, again with Commerce and GSA assistance is issuing this second five-year plan. Building on the first plan, this document contains the following sections:

- o Section I, <u>Current Information Technology Resource Requirements</u>. This section provides a summary analysis of resources used for the information technology activities of

Federal executive branch agencies contained in the FY 1985 Budget of the United States. It includes information for each agency on the amount of resources allocated to data processing and telecommunications activities, the purpose for the expenditure, changes in the inventory of Federal computers, and the personnel resources used to operate and maintain these systems.

- Section II, Fundamentals of Planning. This section introduces the concept of planning as a critical technique for taking advantage of the new technologies. It describes the organizational and management structure needed to develop an effective planning process, and explains the roles of some of the participants.

- Section III, Key Elements of ADP and Telecommunications Strategic Planning. This section describes and discusses the basic elements of an effective ADP and telecommunications planning process. It starts with the plan itself: what should it look like and what activities/considerations should it address. It then focuses on the dynamics of the planning process: who is responsible, how should it proceed, what special considerations should planners anticipate.

- Section IV, Agency Planning Experiences. This section consists of a description of seven representative agencies that have developed and instituted agency-wide strategic planning mechanisms to manage their information resources. The individual profiles look first at the structure and management style of the agency, then describe the agency's planning approach and the plan itself. Finally, each plan is evaluated against the planning elements described in Section III.

- Section V, Tools to Assist Managers With ADP and Telecommunications Planning. This section offers practical assistance to managers confronted with the planning process. It describes in detail one proven planning methodology developed by the Federal IRM Planning Support Program of GSA's Office of Information Resources Management. It also offers a detailed self-assessment checklist to help agencies evaluate the planning process, the plan itself, and the plan implementation and maintenance processes.

- Section VI, Management Implications of the New Technologies. This section provides an interim report on the continuing microprocessor revolution and end user computing, the growing use of networks, and the increasing sophistication and usefulness of packaged software.

The discussion of the elements of effective planning (Section III), agency comments, and OMB's assessment of agency plans will serve as the basis for much more prescriptive guidance on the

content and structure of agency plans to be submitted next year. The discussion of methodology (Section V) is presented as an example of an approach to planning that seems to work. It is not the intent of OMB to prescribe a planning methodology.

In late summer of 1984, more prescriptive direction will be issued on the content and structure of agency plans to be submitted in early 1985.

The fall 1984 budget review process (FY 1986 budget) will focus on (1) major systems initiatives identified in the spring; and (2) a continuation of efforts to streamline and consolidate common and multi-agency systems.

In 1985, a more structured version of the spring and fall processes outlined in 1984 will be undertaken.

I. CURRENT INFORMATION TECHNOLOGY RESOURCE REQUIREMENTS

A. INTRODUCTION

This section provides a baseline for Federal expenditures on information technology resources and a projection of future expenditures through FY 1985.

It provides a summary analysis of resources used for the information technology activities of Federal executive branch agencies contained in the FY 1985 Budget of the United States. It includes information for each agency on the amount of resources allocated to data processing and telecommunications activities, the purpose for the expenditure, changes in the inventory of Federal computers and the personnel resources used to operate and maintain these systems.

This analysis is based on data supplied by the agencies to OMB in response to OMB Circular No. A-11, Section 43. It covers the full range of information technology activities including telecommunications as well as data processing. It does not include:

- o Information technology activities funded by Federal grants;
- o Classified information technology activities;
- o Computers which are embedded in combat weapon systems, space exploration systems, or similar computer systems;
- o Analog computers;
- o Legislative or judicial branch information technology activities; and,
- o Certain telecommunication facilities and services specifically exempted by FPMR subpart 101-37.102.

A more detailed definition of the resources included in this summary can be found in Section 43 of OMB Circular No. A-11.

B. SUMMARY ANALYSIS

Total obligations for information technology systems in Federal executive agencies for the years FY 1983 to FY 1985 are:

- o FY 1983 - $10.4 billion - actual
- o FY 1984 - $12.3 billion - estimated
- o FY 1985 - $13.9 billion - estimated

The information technology systems budget is projected to increase at a faster rate than the overall Federal budget.

- o The $1,933 million expected increase in information technology obligations from FY 1983 - FY 1984 represents an 18.6% growth rate, which exceeds the 6.4% expected growth in overall obligations.
- o The $1,599 million expected increase in information technology obligations from FY 1984 - FY 1985 translates to 12.9% increase, which exceeds the 8.3% projected increase in overall Federal obligations.

Obligations for information technology systems in FY 1983 accounted for 1.2% of the total Federal budget. The percentage of the total budget spent on information technology systems is expected to rise to 1.3% in FY 1984 and to 1.4% in FY 1985.

The largest absolute growth in information technology system obligations between FY 1983 and FY 1985 is expected in:

- o Department of Defense - an increase of $2,101 million, a 41.2% rise over three years.
- o Department of Health and Human Services - an increase of $292 million or 23.8% increase over three years.
- o Department of Energy - an increase of $218 million, a 33.2% increase over three years.

Significant relative growth in total information technology system obligations, as reported by agencies in their budget estimates, between FY 1983 and FY 1985 is expected in:

- o Office of the United States Trade Representative which expects an increase of 112.9% ($1.07 million). USTR is planning to purchase a new mainframe to house and process its trade information system.
- o Securities and Exchange Commission expects an increase of 88.6% ($5.11 million). This increase can be attributed to the enhancements planned for existing SEC systems and to the Productivity Innovation by Computers project which will provide for the electronic filing project.

- o Justice Department projects an increase of 64.5% ($153 million). A large part of these funds will be applied to the FBI and the upgrading of its top-priority investigative activities and general ADP resource reliability.

Capital investments for site preparation and the purchase of hardware and software are expected to increase significantly from the FY 1983 level of $1,447 million to $2,586 million projected for FY 1985. The largest capital investments projected for FY 1985 are: Air Force, $474 million; Navy, $418 million; Army, $366 million; Energy, $233 million; NASA, $152 million; and Justice, $128 million.

Obligations for leases and rentals including equipment rental, leased space, software and other leased services, are increasing at a slower rate than capital investments for information technology systems. The increase in lease and rental obligations from FY 1983 to FY 1985 is projected at $580 million or 35.6% increase. The increase in capital investments over the same budget period is $1,139 million, an increase of 77.1%.

Obligations for commercial services including ADP and telecommunications services, operations and maintenance, systems analysis and programming, and systems design are increasing. In FY 1983, $4,887 million of the information technology budget was spent on commercial services. In FY 1984, $5,719 million has been allocated for commercial services, while in FY 1985, $6,377 million of the information technology budget is projected for commercial service expenditures. Almost half of the information technology budget is allocated for commercial service obligations.

The size of the information technology workforce, as measured in work years, has not grown at the same rate as have the obligations for equipment or commercial services. From FY 1983 to FY 1985, work years are projected to increase from 110,038 to 117,271 which is a 6.6% increase. This is much less than the 33.4% increase in total information technology obligations.

The Federal Government continues to purchase rather than lease its equipment. In FY 1983, 88.8% of the large CPU's in use were owned by the government. Obligations for equipment purchase in FY 1985 are projected as 146.7% higher than obligations for equipment lease.

The average length of time in service for Federal Government computers, at the end of FY 1983 is 6.6 years. This is a decrease in length of service over FY 1979, at which time the average time in service was 7.3 years.

C. **EXHIBITS**

The exhibits provide additional illustration of the information technology resources budgets for FY 1983, FY 1984, and FY 1985:

- Exhibit 1 Federal Information Technology Obligations - a list of the total information technology obligations for FY 1983, FY 1984 and FY 1985 as reported by the agencies in Exhibit 43A which is submitted in response to OMB Circular No. A-11;

- Exhibit 2 Federal Information Technology FY83 Obligations a pie chart illustration of the major areas in which information technology dollars are spent and their relation to each other and to the total FY 1983 information technology budget;

- Exhibit 3 Federal Information Technology FY84 Projected Obligations - a pie chart illustration of the major areas in which information technology dollars will be spent and their relation to each other and to the total FY 1984 information technology budget;

- Exhibit 4 Federal Information Technology FY85 Projected Obligations - a pie chart illustration of the major areas in which information technology dollars will be spent and their relation to each other and to the total FY 1985 information technology budget.

Federal Information Technology Obligations
(Thousands of Dollars)

	1983 Actual Obligations	1984 Planned Obligations	1985 Planned Obligations
NATIONAL SECURITY AND INTERNATIONAL AFFAIRS			
Air Force	1,815,104	2,087,763	2,626,610
Army	1,404,341	1,724,531	1,861,917
Marine Corps	114,953	139,586	153,892
Navy	1,276,153	1,486,831	1,851,814
OSD & Defense Agencies	487,243	598,668	704,087
(Defense Total)	5,097,794	6,037,379	7,198,320
SSS	5,832	6,150	6,248
EXIM	1,174	1,457	1,570
USIA	20,140	31,422	22,982
AID	19,467	19,115	21,586
USITC	1,951	1,769	1,844
STR	956	1,659	2,035
State	44,517	49,671	51,931
(Non-defense Total)	94,037	111,243	108,196
SUBTOTAL	5,191,831	6,148,622	7,306,516
ECONOMICS AND GOVERNMENT			
Commerce	237,915	269,637	281,402
Justice	236,715	386,556	389,345
Treasury	369,699	424,899	518,285
Transportation	200,336	239,040	226,396
GSA	107,287	119,483	132,007
OPM	21,729	31,262	32,297
OMB	2,700	3,620	3,150
HUD	46,828	54,502	60,161
FEMA	116,550	122,806	134,716
CAB	1,848	1,521	1,454
ICC	3,790	3,188	3,334
NTSB	1,728	942	592
SBA	16,560	17,979	18,616
PCC	4,594	4,980	4,929
FHLBB	3,419	4,282	4,416
SEC	5,765	6,331	10,871
OA	6,381	7,098	7,973
FTC	4,491	3,789	3,825
NCUA	3,004	3,461	3,418

Exhibit 1: FEDERAL INFORMATION TECHNOLOGY OBLIGATIONS

	1983 Actual Obligations	1984 Planned Obligations	1985 Planned Obligations
ECONOMICS AND GOVERNMENT (Continued)			
CEA	195	257	257
FCC	7,096	7,777	8,840
FMC	423	225	500
SUBTOTAL	1,399,053	1,713,635	1,846,784
HUMAN RESOURCES, VETERANS AND LABOR			
HHS	1,226,308	1,486,114	1,518,045
Education	59,441	64,199	68,471
LABOR	94,340	104,744	108,322
VA	264,812	345,918	319,713
RRB	13,076	16,619	18,065
ACTION	1,467	1,745	1,713
NLRB	2,518	2,325	2,379
FMCS	488	809	751
EEOC	2,103	2,224	2,308
NEA	695	503	564
NEH	646	620	620
Nat. Med. Bd.	166	321	284
SUBTOTAL	1,666,060	2,026,141	2,041,235
NATURAL RESOURCES, ENERGY AND SCIENCE			
Agriculture	335,450	381,221	445,350
Interior	201,848	254,980	267,154
Energy	657,704	743,355	876,152
Corps of Engineers	78,906	100,381	98,355
EPA	65,106	71,434	81,318
NASA	660,480	735,805	796,603
TVA	88,802	96,397	97,933
NSF	22,076	22,560	29,190
CFTC	2,810	3,412	2,957
NRC	18,863	22,220	27,019
Smithsonian	11,341	13,233	15,768
SUBTOTAL	2,143,386	2,444,998	2,737,799
GRAND TOTAL	10,400,330	12,333,396	13,932,335

Exhibit 1: FEDERAL INFORMATION TECHNOLOGY OBLIGATIONS

FEDERAL INFORMATION TECHNOLOGY

FY 83 OBLIGATIONS – $10,400,330,000

Exhibit 2: FEDERAL INFORMATION TECHNOLOGY

FY 83 OBLIGATIONS

FEDERAL INFORMATION TECHNOLOGY

FY 84 PROJECTED OBLIGATIONS – $12,333,396,000

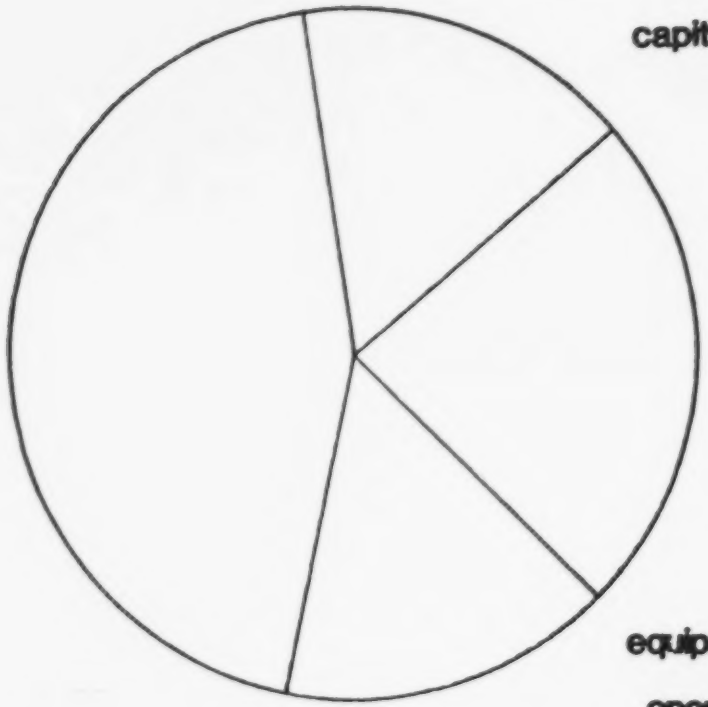

Exhibit 3: FEDERAL INFORMATION TECHNOLOGY

FY 84 PROJECTED OBLIGATIONS

FEDERAL INFORMATION TECHNOLOGY

FY 85 PROJECTED OBLIGATIONS– $13,932,334,000

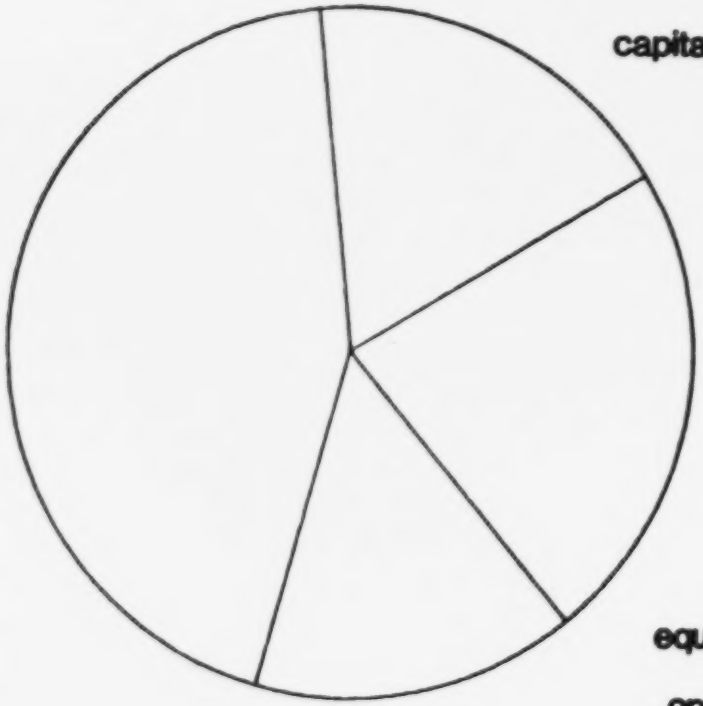

Exhibit 4: FEDERAL INFORMATION TECHNOLOGY

FY 85 PROJECTED OBLIGATIONS

II. FUNDAMENTALS OF PLANNING

The Government, like information-intensive industries (banking and insurance, for example), depends on having accurate and timely information with which to accomplish its missions. To be effective, it must manage that information in the most efficient way possible.

Yet, over the past three decades, the Government has introduced computer and telecommunications-based systems to manage its information with little thought as to the longer range implications of those changes. Belatedly perhaps, agencies have come to realize how substantially dependent they are on these systems. And with this realization has come a growing appreciation that it is essential to manage them well. Perhaps the key element in the effective management of information resources is planning.

The next four sections of this volume examine the concept of planning in detail. The first section describes some of the components of an effective planning system and examines planning activities within the context of an organization's management structure. The second section describes some key elements of strategic planning: the process of preparing a plan and the product-- the plan--itself. The third section describes the planning activities of several representative agencies. The last section provides some tools to help managers plan: an agency self-assessment checklist and a description of one proven planning methodology developed by the General Services Administration.

It should be kept in mind that the information provided below is conceptual rather than prescriptive. It is intended to help agency managers understand and think about planning, rather than laying down a single "authorized" methodology. Certainly, there are issues related to planning that will not have been touched upon in this document. Likewise, there are issues covered here which some managers may have dealt with in different although equally effective ways.

A. PLANNING

This section deals with the planning function. The organizational placement of the planners--a critical issue--will be discussed below under Management Structure.

1. DECISION FRAMEWORK

Planning is the process of establishing a course of action to achieve desired results; it can occur on different levels:

- o Long-term or strategic planning is a process for defining agency missions and identifying agency goals and objectives as projected over a specified period of time. In the context of ADP and telecommunications, long-range planning develops and documents the agency's direction and specifies the activities and resource requirements necessary to support stated missions and objectives.

- o Tactical planning involves identifying and scheduling the appropriate means for attaining the stated objectives of individual ADP and telecommunications activities that support the strategic plan.

- o Operational planning integrates individual tactical plans and drives the day-to-day activities of line operations.

However, planning for planning's sake is an unrewarding and expensive activity. For the planning function to have meaning, it is necessary for the planners to have a good grasp both of the strategic objectives of the organization as well as the technical and economic feasibility of plans under consideration. The objectives and feasibility will vary from organization to organization, but the following generic topics, with some associated questions, provides a rough framework in which to begin "planning for planning."

- o Strategic Decisions What technologies are or will soon be available to support the strategic objectives of the organization? What are the cost trade-offs between the technologically "best way to go" and the technologically "adequate way to go?" Can we support the strategic objectives with what we have?

- o Tactical Decisions (for incorporating new technologies). Is the program best suited to centralization, decentralization or some mix? Should we engage in pilot projects? Contract for competing designs? Should we rely on a strategy of design evolution, specific design requirements, or some mix?

- o Use of Commercial products and Services and Standardization. In selecting systems' networks and architectures are off-the-shelf products or standards (e.g., FIPS, Federal, ANSI, IEEE, ISO) available or are department standards required?

- o Program Phasing. What are the priority requirements to support the strategic objectives? Do we have the requisite personnel on board? If not, can we get them and how long will it take? Is the equipment we need really available or is it in the commercial product announcement stage? Is the equipment in a test site or fully operational? What effect will procurement regulations have on phasing? Is "compatible" equipment really compatible? If a new product is on the horizon, is it worth waiting for?

2. PLANNING ACTIVITIES

Whether, and how well, an organization takes advantage of the new technologies will depend in large measure on the effectiveness of its planning process. A too-common approach to planning is one in which an organization's overall systems plan is a collection of individual project plans collated into what amounts to little more than a numerical sum. This type of plan results in a number of loosely coordinated systems with considerable hardware, software, and data redundancy as well as incompatabilities.

At the other extreme is the attempt to wrap nearly all new development into a huge and inflexible system that would take 3-5 years to develop and would require all available resources. Whereas the "collection of the projects" planning approach is uncoordinated and redundant, the "one enormous system" approach is prone to excessive overhead, vulnerable to incorrect assumptions and decreasing technology cycles, and likely to go over budget and beyond schedule while failing to provide what is really needed.

An effective planning system requires a number of integrated components (discussed below) which are used as tools to continually monitor and update the institution's plans. The agencies that will be most successful in planning will be those that are able to streamline their approval processes and to adapt their management structure to this new environment of change.

a. Technology Forecasts and Assessments

Until recently, technology forecasting was handled as an incidental adjunct to the acquisition process. However, as it became apparent that the new technologies have a real effect on the strategic objectives of the organization, and that the rate of technological change may have a devastating effect on the budget, technology forecasting has become an indispensable tool for the planners. While there are many techniques available for forecasting, it is doubtful that any of them are as useful for planning purposes as a frequently updated "expert" forecast combined with forecasts of market structure and the organization's own assessment of its current resources.

While "expert" forecasts tend to be somewhat less expensive than those that rely on computer-based simulations, they are nonetheless costly. It therefore makes sense for agencies to band together to fund a cooperative forecast, which concentrates on areas of mutual interest. This leaves the agencies free to develop their own special-interest forecasts and to detail the implications of the coming technologies for the individual agencies. Agency documents should include:

- Areas of special technological interest (e.g., super computers);
- Areas of technological stability and skills requirements (and short-falls) within the organization;
- Capital investment requirements and, insofar as possible, benefit ratios;
- An index of current applicable guidelines and regulations; and,
- An index of Federal and industry standards with fall back plans for cases where needed products do not comply.

b. Technology Transfer

The technology trends have led to a situation in which increasing numbers and kinds of people are using the technology; are aware that they are affected by the technology; and are involved in the technology-acquisition decision process. It follows that increasing numbers and kinds of people need to be included in the planning process if the plans are to be implementable and implemented. This implies that planning should not be confined to the ADP/MIS shop--indeed, it implies that planning should not be confined to the Office of Information Resource Management. Rather, the planning process should include strategic policymakers and functional managers as well as the technical staff.

The concept of technology transfer has to be expanded from a information technology model that envisions the technologically-smart professional "selling" a plan to the decision-maker to a model in which the decision-maker, functional managers, and information technology professionals each contribute the relevant information contained in their respective areas of expertise. The information technology professional will never (or at least, should never) "sell" a plan that the policymakers do not need and the functional managers cannot use. Seminars and workshops with a mix of participants are effective vehicles for this type of technology transfer.

c. Ad Hoc Experimentation

In this era of end-user computing, virtually every desk-top computer in the hands of a professional leads to some sort of experimentation not necessarily related to the purpose for which the equipment and software were originally acquired. Management discussions about whether to encourage or discourage this activity notwithstanding, as more professionals understand the capabilities of the technologies, more of this kind of experimentation will occur. The real question is not whether or not to encourage it, but how to harness it so that its benefits will accrue to the organization.

One method might be to reward promising efforts with help from the central information technology shop, contingent on the resources available to that shop. A competition for central help should not be used as a vehicle to stop projects deemed less promising; such actions would simply serve to limit the number of competitive entries rather than the renegade pilots themselves. However, a formal competition would serve two useful purposes. First, it would give the most promising projects the greatest chance for success while shaping them into a form that might be efficiently expanded for organization-wide use. Second, it would surface all such efforts from all over the organization and minimize duplication of effort.

A second method would be to reward, through citation or cash bonus, documentation of successes and failures alike. The analysis of failure can be at least as instructive as the trumpet of success.

Whatever methods are used to harness this activity, it is essential that the functional managers be brought into the process. They have the most to lose if operations get out of control. Conversely, they have the most to gain if they are successfully harnessed.

d. Analyses of Systems Architecture

Formal analyses of systems architecture, including requirements for computation, word processing, and communications are essential to adequate planning. The analysis should be integrated into the overall planning process.

e. Analyses of Data Architecture

The architecture of an institution's data system is analogous to the architecture of a network; that is, the data system has a "backbone" of institutional data which is relatively stable. For example, payroll and personnel data are contained in the "backbone" systems which, while they

must be maintained, are not subject to frequent, violent upheavals. Other information is of a more volatile nature, its form and content changing as strategic objectives evolve and as people--with their infinite variety of work habits and biases--move in and out of the organization. The analysis of the data architecture should focus on several areas: Who needs what information; who has what information; how can the information be brought from where it is to where it is needed?

B. MANAGEMENT STRUCTURE

The way the management of an organization is structured determines who will deal with the issues raised above and the manner in which they deal with them. There is no management structure that is "right" for all organizations.

However, the technology is bringing about massive changes in the logistics of information. In a distributed resource environment, core information systems must be accessible to (and protected from) network-wide users; distributed information sources must be identified and coordinated. Additionally, in this era of rapid technological change, the hitherto discrete functions of planning, management, and evaluation tend to merge--formally or informally--into a single, continuous activity.

This section will attempt to offer some guidelines for organization, concentrating on the planning function, the IRM office, and the roles of various players.

1. ROLES

While management structures vary over time and among organizations, certain functions can be identified regardless of organizational structure,which will always exist in one form or another. For instance, there will always be policymakers, information resource managers (or their equivalents), ADP/communications operations managers, and functional managers.

Each of these entities has its own role to play in the management of information resources. These roles must be specifically delineated if intra-organizational warfare is to be avoided. The roles and responsibilities associated with each of these entities are:

a. The Policy Maker

- Articulation of the strategic objectives of the organization;
- Designation of the core information systems which must be designed, operated, and maintained on a uniform basis. These decisions must include the

organization of the computer, telecommunications, and records management functions required to support the backbone of the data architecture;

- Designation of the ground rules governing information systems which flow up through the organization. Such ground rules might include:
  - Centralized direction for all IRM functions supported by a common technology, such as ADP/MIS, telecommunications, and office automation;
  - Designation of a locus for defining the common agency-wide data elements; and,
  - Designation of the methods of budgeting and funding for all bottom-up information systems, including the use of shared resources such as telecommunications.

b. The Information Resource Manager

- Maintenance of agency-wide data interfaces;
- Analysis of technical issues as they relate to strategic objectives;
- Translation of key policy, management, and technical issues into the variety of "languages" understood at the various levels of the organization;
- Formulation and dissemination of technology assessments and forecasts;
- Technical integration of data architecture;
- Systems architecture analysis and acquisition; and,
- Development of backbone data architecture.

c. The Operations Manager

- Maintenance of the information networks;
- Administration of the backbone architecture;
- Evaluation of tactical impact of strategic decisions;
- Evaluation of system architecture analyses and impacts; and,
- Maintenance of data integrity.

- Responsibility for training staff in concepts of:
  - Computing,
  - Records Management,
  - Security, and;
  - Equipment and software acquisition and maintenance.

d. The Functional Manager

- Responsibility for the integrity of end-user generated data;
- Evaluation of the impact of strategic decisions on program;
- Acquisition of workstations;
- Documentation of ad hoc pilot projects;
- Identifications of what information is amenable to automation; what is better left to memos and word-of-mouth? and,
- Decision as to what is the backbone information administered by the central ADP/MIS shop and what information should be distributed; what are the appropriate interfaces between the two types of information?

III. KEY ELEMENTS OF ADP AND TELECOMMUNICATIONS STRATEGIC PLANNING

The following sections describe and discuss the basic elements of an effective ADP and telecommunications planning process, starting with the plan itself: what should it look like and what activities/considerations should it address. A following section examines the dynamics of the planning process: who is responsible, how should it be accomplished, what special considerations should planners anticipate.

A. ELEMENTS OF THE PLAN -- THE PRODUCT

A strategic plan documents a course of action for achieving stated mission and program objectives that integrates specific activities to be pursued and the resources required to support those activities. Information is presented in such a way that the planning document can effectively guide activities of the organization and demonstrate interrelationships among the identified actions. Building from a base of agency mission, a good plan reflects the current status of ADP and telecommunications within the agency and documents the rationale and specifics for planned activities. The information thus lays the groundwork for measuring performance against the plan.

1. MISSION IDENTIFICATION

Strategic planning begins with a statement of agency mission(s). The agency's mission is the reason for its existence. It is the driving force behind all agency functions, including those addressed in a strategic ADP and telecommunications plan. Once the mission is stated, all other elements of the agency plan are subordinate to it.

For this reason, the agency mission should be clearly stated in the opening section of the plan. The plan should also define the functions of subordinate organizations addressed in the agency plan, and link them to the agency mission.

In many agencies, organization mission and program objectives are not clearly articulated. This does not preclude development of a strategic plan. Rather, agency officials designated under the Paperwork Reduction Act are obligated to initiate a planning process which in turn should demonstrate the value of and reinforce the need to develop meaningful agency mission and program objectives statements. Often the development of a plan will force for the first time, a formal articulation of agency

missions and goals. Future ADP and telecommunications plans should then be appropriately modified to support the agency's programmatic direction.

2. STATEMENT OF PROGRAM OBJECTIVES

After identifying the agency mission(s), the plan should identify program objectives intended to support the mission. The objectives should be written in a form that is directly applicable to the mission and to the day-to-day activities of the agency.

Thus, each program objective should relate directly to the mission and organization it supports and should be stated in measurable terms, specifying scope, time, and explicit performance standards to determine successful achievement.

Program objectives for the organization providing ADP and telecommunications support need to be supportive of and subordinate to agency objectives and strategies and to reflect the role of ADP and telecommunications as resources for supporting assigned missions of program offices. These program objectives should be prominently presented in the strategic plan because of their importance in satisfying the ADP and telecommunications requirements of the agency.

3. ESSENTIAL AND CORPORATE INFORMATION REQUIREMENTS

Based on the stated missions and objectives, the information to achieve program objectives should be broadly, yet completely identified. Information needs in the plan should be linked to both the organization and program objectives (and ultimately the agency mission they support.) If information is identified that doesn't seem to support an objective, either an objective has been overlooked and should be added to those previously identified, or the agency doesn't need the information.

Corporate information is that which is needed by an oversight organization. Including these corporate information requirements into the plan eases reporting burdens, and eliminates duplicative data collections.

4. ADP AND TELECOMMUNICATIONS STRATEGIES/POLICIES

It is critical to the success of the plan that the agency's strategic direction for ADP and telecommunications and the policy for developing and implementing an agency plan be understood. Thus, a strategy/policy document for ADP and telecommunications should be included in the plan and widely distributed throughout the agency and should serve as the sole guideline for actions and decisions related to ADP and telecommunications throughout the agency.

The strategy/policy section clarifies management concepts to be applied, assigns roles and responsibilities, provides guidance on prioritizing activities and resource expenditures, and reflects

the technical direction to be followed. This section should cover basic policies for developing and implementing the agency plan as well as criteria for evaluating performance.

5. ASSESSMENT OF CURRENT ENVIRONMENT

The current environment must be assessed to determine effective methods for meeting information needs. The assessment should reflect: (1) how identified information needs are presently being met; (2) existing or anticipated policies that will influence chosen courses of action; and (3) projected trends affecting the ADP and telecommunications technologies.

Current information performance should be measured by its effectiveness and efficiency. Effectiveness addresses content: how is the information presented; is it accurate, complete, and timely. Efficiency concentrates on method: how is the information collected, processed, stored and disseminated. An inventory of existing application systems, detailing what information each system delivers as well as how, when, and where it is delivered is necessary for performance analyses.

Policies, both internal or external, strongly influence decision-making. ADP and telecommunications are not unique in this regard. The Paperwork Reduction Act of 1980 (P.L. 96-511) and its pending amendments, the Brooks Act (P.L. 89-306), OMB Circulars and Bulletins, decisions of the Comptroller General, Federal regulations, and internal agency directives all influence what is done, and how it is done. For this reason, the degree of compliance with these policies should be a part of the environmental assessment.

Consideration should also be given to trends in the hardware and software markets, forecasts on the availability and profiles of qualified support personnel, and emerging technology-related issues. This will help to identify specific areas in need of improvement and assess future resource requirements.

6. ADP AND TELECOMMUNICATIONS ACTIVITIES

ADP and telecommunications activities constitute the focal point of the plan. These activities specify how current deficiencies will be corrected and technological opportunities exploited, how conformance with strategies and policies will be attained, how information needs will be satisfied, what the priorities will be, and ultimately how program objectives and missions will be achieved.

ADP and telecommunications activities usually consist of requirements analyses; feasibility studies; development and implementation of new application systems; expansions, modifications or continued operation of existing systems;and non-system-related efforts such as data administration, promulgation of standards and guidelines, or computer literacy training for functional managers. Each of these activities

consumes resources, both personnel and dollar outlays, and directly supports the organization's ADP and telecommunications program. Consequently, they should be incorporated into the strategic ADP and telecommunications plan.

In the plan, activities should be documented in a way that directly relates them to the information requirement(s), organization program objective(s), and agency mission(s) supported. Identification of an activity that does not support essential or corporate information needs indicates either that information needs have not been properly developed or that the activity is irrelevant to meeting the needs of the organization.

Activities contained in the plan should also be considered in relation to one another. Without such integration, planned agency activities would present less than optimal solutions.

To reinforce accountability for plan implementation, organizational responsibility to accomplish each activity should be clearly assigned. Assignments should be based on needs and resource commitments expressed in subordinate level ADP and telecommunications plans.

7. OBJECTIVES OF ADP AND TELECOMMUNICATIONS ACTIVITIES

Not all of the essential information in an organization needs to be automated. However, where automation or telecommunications support appears warranted, the objectives of automating or transmitting the information should be specified.

The statement of objectives for each ADP and telecommunications activity should include quantifiable criteria for successful achievement. Because these objectives are to be used principally in evaluating the degree of success for the individual ADP and telecommunications activities, they should be narrow in scope and precise in their outcome. The objectives should be measurable, and reporting schemes should be developed to ensure that appropriate managers are monitoring and acting on the measurements.

8. RESOURCES REQUIRED

Once planned activities are identified and objectives defined, personnel and financial resources needed to accomplish each activity should be specified. The total for each fiscal year should reflect all resources required by the agency for ADP and telecommunications support.

Identification of required resources serves a dual purpose. During development of the plan, it provides a mechanism for functional managers to express their priorities and degree of commitment to the planned activities. During implementation of the plan, projected resource expenditures establish a basis for measuring performance against the plan.

Identifying the projected return on investment for each activity provides management with additional information for determining priorities, resource commitments and measures of performance against the plan.

9. SCHEDULE

Schedules established for planned activities reflect their priorities and interdependencies. Major milestones should be identified for each activity. From a strategic planning perspective, start and completion dates scheduled during the planning period should suffice. More detailed milestones for each activity should be specified in supportive tactical plans developed by those organizations accountable for their accomplishment. Such milestones need to be considered when scheduling fiscal year resource requirements.

Combined, resource expenditures and milestone completion dates serve as effective tools for monitoring plan implementation. The planning process presented reinforces the role of functional managers in assuming implementation responsibilities, projecting resource requirements, and scheduling activity milestones. Inclusion of an activity in the plan constitutes a commitment by that manager to perform -- on time and on cost. Accomplishment of the activities indicates successful plan performance.

B. ELEMENTS OF PLANNING -- THE PROCESS

The fundamental measure of success for the strategic ADP and telecommunications plan lies in accomplishment of its planned activities. To increase the probability for success, a good plan must be part of a dynamic process that reflects changing missions, technologies, and values or priorities. That process must provide for real and continuous involvement by all levels of management.

1. TOP MANAGEMENT SUPPORT AND INVOLVEMENT

The most critical element of successful ADP and telecommunications planning is support of top agency management. Only their active involvement can ensure that: (1) the programmatic direction of the agency is properly reflected; (2) the direction for ADP and telecommunications is appropriately supportive of the agency's programs; and (3) endorsement of the plan and commitment to perform is adequately generated. Visible demonstration of such support, preferably by the agency head or through an executive steering committee, reinforces recognition of the critical role ADP and telecommunications play in meeting the mission(s) of the agency. Upon completion of the plan, there should be no question of where the agency's ADP and telecommunications program is headed and how it will get there. The plan will document direction and activities and signify management's commitment to proceed.

2. HIERARCHICAL AND INTEGRAL PLANNING

An agency-wide plan for ADP and telecommunications must be based on the plans and needs of its subordinate organizations. As planning becomes institutionalized throughout an agency, subordinate ADP and telecommunications planning should occur at each organizational level. Each level's plan should then be integrated into the next higher level's plan. Thus, office-level plans cover needs of subordinate divisions; bureau plans in turn reflect needs of subordinate offices, and agency-level plans address the needs of subordinate bureaus.

The agency plan, of course, affects all subordinate plans. For instance, changes may be required in one or more subordinate-level plans to meet like needs of several organizations or functional needs which overlap organizational lines.

Such a recursive and hierarchical approach to planning does more than ensure that ADP and telecommunications requirements are adequately addressed; it instills an organizational commitment to the plan. By understanding the plan and participating in the development, functional managers are more likely to support the plan and proceed with implementation.

3. STRUCTURED PROCESS

To complement the hierarchical approach, a planning structure is needed to ensure that subordinate-level plans contain the information necessary to develop an integrated plan at the agency level. Similarly, the structured process ensures that like information, built upon common definitions, common policy direction, and common planning assumptions, is produced.

Use of a structured process also leads subordinate organizations logically through the sequential steps of planning. A strategic ADP and telecommunications plan, from a base of organizational missions and objectives, maps out the current status of ADP and telecommunications, where they need to be at the end of the designated planning period, and how the organization intends to get there. A carefully structured methodology, such as the one presented in Part V, ensures that program mission and objectives serve as the foundation for the plan, that a comprehensive assessment of needs and requirements is made, and that supportive efforts and activities are adequately specified.

The methodology, by eliminating redundant and unnecessary information, also reduces the effort needed to produce subordinate level plans. By specifying what information is needed and how it is to be displayed, a structured methodology permits functional managers to concentrate on the substance rather than form of their plans.

4. ROLE ASSIGNMENT AND ACCEPTANCE

Within all agencies, key individuals and organizational units strongly influence the agency's ADP and telecommunications program. By virtue of their management status or their functional assignments, these officials play important roles in: (1) shaping the direction for ADP and telecommunications in the agency; (2) establishing policies, procedures, and standards supportive of that direction; and (3) determining the allocation of resources (both dollars and personnel) assigned to specific ADP and telecommunications activities. These individuals and organizations will vary from one agency to another, as needs and management styles vary. However, the fundamental roles themselves will remain constant.

Roles and responsibilities for management and operation of the agency ADP and telecommunications program should be identified. Through formal designation of these roles, management procedures and structures that will govern the agency's ADP and telecommunications program are established. Because these management systems fundamentally influence the planning process, it is critical that they be clearly understood and accepted by those involved in developing the strategic plan.

5. INTEGRATION WITH THE BUDGET

As with other agency functions, the ADP and telecommunications program directly influences the budget process. The availability of funds frequently determines whether individual activities are pursued. Effective and efficient management of ADP and telecommunications necessitates planning for resource availability on a multi-year basis. In planning for such, it is essential that resources be available at the time of anticipated activity performance.

Consequently, the development of a strategic ADP and telecommunications plan and identification of activities to be pursued, including resource requirements and scheduled milestones, must be directly linked to the agency's budget process. Resource requirements identified in the initial years of the plan must be consistent with known resource constraints, as contained in Congressionally approved appropriations or OMB budget submissions. However, requirements to support activities planned for later years, again as identified in the plan, provide a valid foundation for future budget justifications. Planned ADP and telecommunications activities and their resource projections should be incorporated into budget submissions formulated by subordinate program offices. Doing so will ensure that, once budget approval is received, funding will be available as scheduled to proceed with implementation of an effective ADP and telecommunications program.

Although strategic ADP and telecommunications planning initially is driven by budget constraints, establishment of a multi-year strategic planning process permits future budget submissions to be driven by requirements and activities contained in the plan.

6. CONTINUITY OF THE PROCESS

Strategic ADP and telecommunications planning remains meaningful only as long as it continues to relate to the real-world environment of the agency. As events redirect planned ADP and telecommunications activities or as revisions to requirements emerge, changes must be made to the plan. In essence, plans should be "living" documents, changing as programmatic direction and priorities fluctuate or as planning assumptions change. If the strategic plan is to remain a meaningful and useful document, procedures are needed to capture activity modifications and to analyze their impact on resource projections and other planned activities. Although a formal update to the strategic ADP and telecommunications plan should occur at least annually in conjunction with budget formulation, procedures to modify the plan during the year are also needed.

7. SUPPORTIVE TACTICAL PLANNING

Strategic planning is critical to the establishment of an effective ADP and telecommunications management program. Although it cannot ensure success, without it, the likelihood of failure significantly increases. However, strategic planning is only one facet of a comprehensive planning structure. To be successful, it must be supplemented by equally effective tactical planning that translates the strategic plan into meaningful plans of action.

Although not contained in the strategic plan itself, a supportive tactical plan, closely paralleling established life cycle management principles, should be developed for each planned activity. This tactical plan is used: (1) by the project director to identify detailed tasks, milestones, and resource consumption; (2) by functional managers to measure performance against the plan; and (3) by agency management to ensure integration with the strategic plan. Properly developed, these plans can also be used to compile annual operating plans for organizational units and to establish a direct link with the agency acquisition process.

A strategic planning process can only be considered effective if (1) it produces a sound plan for managing the agency's ADP and telecommunications program and (2) that plan is subsequently implemented. Supportive tactical planning is critical to successful implementation.

IV. AGENCY PLANNING EXPERIENCES

For most Federal agencies, ADP/telecommunications planning means tactical planning. Most planning is performed by sub-organizational elements with little, if any, integration into an "agency-wide" plan of action. However, a few agencies have developed and instituted agency-wide strategic planning mechanisms to manage their information resources.

A. PLANNING PROFILES

This section examines the efforts of agencies to develop strategic plans for ADP and telecommunications. Seven agencies agreed to share their planning experiences. The plans reviewed may provide general guidance to other agencies for developing their own plans.

The format in which the information is presented was chosen to enable readers to evaluate agencies' approaches by comparing like categories. Thus:

- The Agency section describes the mission, size and management style of the agency and its IRM program.
- The Planning Approach section details timeframes and objectives of the planning effort, including specifics of the planning process used.
- The Plan section contains a general overview of the structure and content of the plan as well as its present status.
- In the Performance Against the Criteria section, each plan and planning process is evaluated against the strategic planning elements presented in Part III above. For each agency, several elements are analyzed.

1. FEDERAL AVIATION ADMINISTRATION

The Federal Aviation Administration (FAA) is part of the Department of Transportation. FAA is charged with regulating air commerce to foster aviation safety; promoting a national system of airports; achieving efficient use of navigable airspace; and developing and operating a common system of air traffic control and air navigation for both civilian and military aircraft.

FAA is composed of a central office, nine regional offices, a technical center, and an aeronautical center. It has a budget of nearly $ 5 billion, and employs over 46,000 persons. FAA estimates the costs for developing and implementing all the projects presented in its Information Resources Management Plan (IRMP) at $602.1 million thru the year 2000.

FAA has a strong centralized program management style within a decentralized execution mode. Information processing and support at FAA is moving from a decentralized environment to a more centralized, distributed environment particularly for large scale national systems.

a. Planning Approach. The IRMP planning effort began in January 1983 and was completed in August 1983 with the publication of the IRMP.

Functional work groups were established to determine information requirements through the year 2000 for their assigned program areas. Six major objectives were assigned to the task force:

- Relate the present posture of automatic data processing hardware, communications, and information systems within FAA.
- Resolve outstanding issues and establish policy and objectives.
- Formulate a comprehensive information requirements statement through the year 2000.
- Determine an action plan to satisfy the information requirements.
- Determine ADP hardware and communications configurations to support the action plan.
- Publish an IRMP covering the information requirements, action plan, and hardware/communications configurations through the year 2000.

Each work group consisted of representatives from the related program office(s), other interested program areas, selected regional offices, and the Office of Management Systems. To determine their long-range information system plans, each functional work group performed a systematic analysis of the information requirements of the assigned program area. This analysis included assembling requirements, determining information area goals, identifying optional methods of reaching those goals, selecting a recommended option, estimating costs, establishing a schedule, and determining return on

investments. Each work group was required to present its findings to the Administrator in formal briefings and to develop a draft chapter for the final IRMP.

b. The Plan. The IRMP is a long-range strategic plan that encompasses 17 years. It is composed of eleven functional information requirements areas. For each area there is a narrative description of the present environment, problems and deficiencies, long-term goals, and information systems evolution, and a detailed description of specific projects to be undertaken. All projects are for efforts in the areas of ADP, supportive data communications and office automation and training. Each project is directly linked to the agency objective(s) it supports.

FAA is in the process of developing a five-year Information Resources Systems Plan, which will build upon the strategic planning base provided by the IRMP.

c. Performance Against the Criteria. A task force methodology was used by FAA to create the IRMP. There was considerable top management support and involvement, especially by the Administrator, during the planning process. A highly structured process was used to solicit information needs from all agency levels and programs. Experts from private industry, academia, and other government agencies were also consulted.

During the planning process, the work groups presented their findings and recommendations directly to the Administrator. Key program officials who are responsible for their implementation also attended these briefings and approved them at their own preview briefing. Letters of budgetary preparedness to support these activities were obtained from these key officials, but the resources required to support the planned activities in non-budgeted years may or may not be assigned, thereby jeopardizing the plan's implementation. FAA sees the need to institutionalize a hierarchical and integral planning approach in developing future plans and is currently working toward that goal. This will assure that those responsible for committing necessary resources are supportive of the planned activities.

Problems arose during the planning process, and continue to occur because of the lack of clear central policy and planning guidance. Governing strategies were never formally documented in one section. They are scattered throughout the plan, and some critical issues, such as role assignments and systems ownership concepts were discussed but are still being resolved. However, project accountability has been fixed. This effort needs to continue to clearly define and document the management

principles to govern FAA's IRM program. Without such guidance, coordinating individual activities cannot be ensured.

The IRMP contains enhancements and new developmental efforts. FAA needs to develop a comprehensive IRM plan that not only includes these efforts but also ongoing operational activities.

FAA must integrate the planning and budget cycles. Planned activities must be tied to known resource constraints. Budget and personnel constraints can have a serious impact on planned activities. FAA is working to closely integrate their planning and budget cycles to ensure the availability of resources for activities identified in their Information Resources Systems Plan (IRSP).

The IRMP is a good long-range planning document. It sets the direction that FAA will pursue over the next 17 years. It defines the Agency's missions and objectives and ties planned IRM activities to the missions and objectives. Each planned activity is presented along with the resources required and implementation schedule. The plan's major weakness is that FAA has not finished institutionalizing the supporting policies, procedures, and organizational structure that is critical for the successful implementation of the plan.

As FAA proceeds in the development of its five-year Information Resources Systems Plan, more detailed information will be compiled and procedural and policy voids will be filled. In addition, the agency is developing an automated database to support its planning activities.

2. FEDERAL BUREAU OF INVESTIGATION

The Federal Bureau of Investigation (FBI), as part of the Department of Justice, is the Nations's chief investigative and law enforcement agency. In order to meet mission requirements in such investigative areas as organized crime, white-collar crime, violent crime, counter-terrorism, and foreign counter-intelligence, the FBI found the need for more detailed as well as timely and accurate information. Thus, the role of automation -- particularly computer-based information systems -- was substantially increased.

The FBI is a highly centralized organization with a headquarters office in Washington, DC, that provides overall management support and policy formulation and guidance to various FBI field offices located throughout the United States. The FBI has a budget of over $1 billion and employs approximately 20,000 persons. The FBI's budget for Information Resources Management

is $98.4 million. Responsibilities for FBI automation research, planning, development, and operations are assigned to the Technical Services Division.

a. Planning Approach. The IRM planning process at the FBI evolved from a thorough evaluation (completed in 1977) of FBI data processing systems. Extensive organizational changes resulted that enhanced personnel quality and modernized computer hardware. Modern information resource planning and implementation methodologies were adopted and served as a foundation for FBI's planning approach.

In developing its plan, the FBI made an extensive assessment of existing software, hardware, telecommunications facilities, personnel skills, and planning methodologies. This assessment established a benchmark of functional information processing requirements. Results of this review served as a point-of-departure for achieving the Agency's automation planning goals and required future systems capabilities. A formal executive steering group was created to recommend priorities for major automation enhancements.

b. The Plan. The goal for strategic automation planning at the FBI is to develop a coordinated, long-term course of action to satisfy in a cost-effective, operationally feasible, and technologically sound manner the information requirements related to FBI's missions and functions. Functionally, the strategic plan spans the entire organizational structure, vertically as well as horizontally. An important aspect of the plan is the adaptation of the organization to environmental changes.

c. Performance Against the Criteria. Top management at the FBI is committed to taking full advantage of emerging technology to assist in information processing. They realize that automation is playing an increasingly important role in the support of FBI's investigative and law enforcement services missions and vital resource management activities.

A highly structured hierarchical approach was used by the FBI to develop the strategic plan. Sub-organizational elements were requested to closely consider opportunities for exploiting advanced information technology in developing their future plans. These plans were used to build an integrated plan of action for meeting Agency requirements. A formal executive steering group, composed principally of Assistant Directors with recent field experience, recommended priorities for major automation enhancements.

Tactical plans were developed to implement the activities contained in the strategic plan. Schedules reflecting the priority of the activities and the interrelationship

between them were established. FBI personnel are assigned responsibility for specific activities and are held accountable for their completion.

The Systems Review Board composed of high-level managers and technicians conducts intensive reviews of selected system development to assure efficient application of financial and human resources. Each major activity is reviewed every three months or at a major milestone.

FBI continually analyzes internal and external factors to shape its information technology direction. This allows the plan to relate to the FBI's real world environment and remain a meaningful and useful document.

Procurement authority is vested at FBI headquarters. The Technical Service Division reviews all procurement requests to ensure compliance with the long-range plan. Procurement requests for items not included in the plan are disapproved unless significant justification as to their need is provided.

The FBI's planning process is integrated into the budget process. FBI personnel find the plan extremely useful for preparing the A-11 budget exhibits 43 A and B that are required by OMB.

The FBI has a good long-range strategic plan for the automation of its information systems through the 1990's.

3. GENERAL SERVICES ADMINISTRATION

The General Services Administration (GSA) is an independent agency established in 1949 to bring about improvements and economics in Federal management practices. Original authorities encompassed Federal procurement and supply, records management, and the operation and maintenance of public buildings. Legislation has since expanded those authorities to also encompass Federal transportation, traffic, telecommunications, strategic materials stockpiles, and automatic data processing management.

GSA's Central Office is organized into five service offices and nine staff organizations. Eleven regional offices are located throughout the country to provide support services to other Federal agencies within defined geographical areas. It has an annual operating budget of $6.6 billion, and employs over 30,000 persons. The initial 5-year ADP strategic plan captured total projected ADP and data communications expenditures for the agency of $70 million for FY 1983 and nearly $280 million for FY 1984 - FY 1987.

GSA operates under a decentralized management style. Overall program and policy direction is provided by the Administrator, with assistance from the Deputy Administrator and three Associate

Administrators. Heads of Services and Staff Offices manage national programs and assess program performance. Program management reviews are presented to the Administrator and Deputy Administrator quarterly. Regional Administrators, who report to the Associate Administrator for Operations, are responsible for implementation of GSA programs and policies within their regions.

The Office of GSA Information Systems provides central planning, policy and procedural guidance for the agency's internal information resources program. Operational responsibilities for individual application systems are decentralized to the Services and Staff Offices.

a. Planning Approach. In July 1982, the Administrator initiated a special task force, headed by a member of his immediate staff, to develop a strategic 5-year ADP plan. A mandatory 90-day deadline was imposed. Due to the diversity of applications throughout the agency, it was decided to employ a planning approach that would develop an agency-wide plan based on plans developed by the individual Services and Staff Offices. Only national information systems and headquarters requirements were addressed. It was made clear from the outset that the plan would serve as the basis for future appropriation requests.

During the first 30 days, the task force identified information to be contained in the plan and developed a highly structured questionnaire to be used by Services and Staff Offices to document their ADP plans. Agency missions and agency program objectives were concurrently documented and "Governing Strategies for ADP in GSA" were developed in draft and coordinated with the appropriate officials.

A member of the task force was assigned to each Service and Staff Office during the second 30 days to assist in the development of their individual plans. By the end of this phase, each major organization had documented its missions and program objectives, inventoried existing application systems, identified areas in need of improvement and activities to be pursued (with resource and schedule projections), and enumerated planning assumptions.

During the remaining 30 days, the task force reviewed and analyzed the individual planning submissions and, based on the information they contained, developed an agency-wide plan addressing ADP program management, hardware, software, communications, data and management information. The draft plan was then presented to the GSA Executive Steering Committee for IRM, subsequently modified and submitted to the Administrator for approval. Formal adoption of the plan occurred in March 1983.

b. The Plan. The plan is a five-year plan, addressing ADP and supporting data communication requirements. Office automation that relies on ADP is also included. The plan

was presented in four volumes: an executive summary; Volume I--5-Year ADP Strategic Plan; Volume II--Compilation of Service and Staff Office Submissions; and Volume III--ADP Operating Systems Catalog. The planning period embraced by the initial plan was FY 1983 - 1987.

Volume I, the agency-wide plan building from a base of agency mission and program objectives, documents fundamental policies that governs the agency's ADP program, examines the current ADP environment, identifies key ADP activities to meet agency objectives, analyzes total resource requirements to support all planned ADP activities, and presents plan management and tracking procedures. Supportive information on all planned activities is contained in Volume II. As in the individual planning submissions prepared by Services and Staff Offices, the agency-wide plan addresses six aspects of the ADP program: (1) ADP program management; (2) Hardware; (3) Software; (4) Communications; (5) Data; and (6) Management Information. Volume III presents an inventory of existing application systems organized by system owner, capturing that information about each system necessary for strategic planning purposes.

c. Performance Against the Criteria. The planning effort was initiated by the Administrator and could not have received a higher expression of top management support. The 90-day timeframe for producing the plan reinforced the priority placed on its development. Active involvement of key functional managers was generated through: (1) periodic progress reports at the Administrator's staff meetings; (2) the establishment and participation of a Review Committee as an advisory board to the task force; (3) the requirement for Heads of Services and Staff Offices to personally transmit their planning submission to the task force -- with the understanding that signature reflected a commitment to perform; and (4) the review and endorsement of the plan by the Executive Steering Committee for Information Resources Management.

The planning approach designed by the task force was clearly hierarchical in structure. Services and Staff Offices developed their individual plans, which in turn provided the foundation for the agency-wide plan. Room for improvement, however, existed in the integration of the plan at the agency level. Nevertheless, the approach accumulated and documented information, previously nonexistent, that would permit future agency-wide analysis and integration. To strengthen this capability, GSA subsequently established a planning work group, composed of representatives from each Service and Staff Office responsible for preparing their individual plans. Through improved communications among organizations, and the willingness of members to cooperatively address duplicate

or interdependent efforts, integration of the plan was significantly enhanced for the FY 1984-1988 planning period.

Use of a highly structured questionnaire to document Service and Staff Office plans proved highly beneficial. It structured the thought process followed for developing their plans, ensured that information needed to prepare the agency plan would be captured, provided linkage of all information back to agency missions and program objectives, and permitted concentration on developing sound plans while minimizing documentation requirements. Although questions arose concerning instructions and definitions used with the questionnaire, oral clarifications were developed and subsequently refined and incorporated as revisions to plan update procedures.

In light of the then recent reorganization establishing the Office of GSA Information Systems, clarification of policy direction and assigned responsibilities became critical. Through development of "Governing Strategies for ADP in GSA," differences in perspectives and understanding were identified, resolutions pursued, and official determinations documented. The fundamental principles that would govern GSA's ADP program became known and subsequently communicated throughout the agency by their inclusion in the plan and as dissemination in the formal issuance system. To reinforce the full scope of the ADP program, the strategies also addressed the six aspects of the ADP program: ADP program management, hardware, software, communications, data, and management information. Communication initiated during the "hammering out" of the Governing Strategies opened the door for future dialogue and enhanced organizational understanding. Awareness of and appreciation for divergent opinions seeded a spirit of cooperation that had not previously existed.

The most serious weakness of the plan was its failure to present cost savings or cost avoidance information. When the initial plan was submitted to the Executive Steering Committee, no economic basis existed for prioritizing activities or for justifying the significant investment of agency resources represented by the plan. Although the plan was endorsed by the Committee and approved by the Administrator, it was with the clear understanding that quantitative return-on-investment information would be presented in future plans. This was accomplished in the FY 1984-1988 plan.

Upon completion of the initial five-year strategic plan, immediate steps were taken to institutionalize the plan development process by the task force, to initiate tactical plans supporting each planned activity, to coordinate procurement actions with activities contained in the plan, and to monitor performance against the plan. Since that

time, the first annual update to the plan (FY 1984-1988) has been completed and the second update (FY 1985-1989) is currently in progress.

GSA believes that development of its baseline strategic plan and subsequent refinements has resulted in dramatic improvements to its ADP program.

4. DEPARTMENT OF THE INTERIOR

The Department of the Interior (DOI) has responsibility for most of the nationally owned public lands and natural resources. This includes fostering the wisest use of land and water resources, protecting fish and wildlife, preserving the environmental and cultural values of the national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses mineral resources and works to assure that their development is in the best interests of all people. To accomplish its mission, DOI is composed of nine bureaus: the National Park Service, the U.S. Fish and Wildlife Service, the Bureau of Indian Affairs, the U.S. Geological Survey, the Bureau of the Mines, the Office of Surface Mining, the Bureau of Land Management, the Bureau of Reclamation, and the Mineral Management Service. A total of 362.2 person months had been committed by the bureaus and the Office of the Secretary for IRM projects between FY 1984 and FY 1988.

a. Planning Approach. In August 1982, DOI published a comprehensive IRM Long-Range Plan covering FY 1983-87. This plan took nearly two years to complete. Each bureau identified the projects that it believed must be undertaken to accomplish their missions. Priorities were established in consideration of expected resource and budget levels over the planning horizon of five years. The projects represent the bureaus' collective planning process. Opportunities were found to undertake projects jointly among Bureaus and thereby enable necessary projects to be undertaken which might have been foregone due to inadequate resources and budgets. The implementation of the plan began during FY 1983 and is continuing.

b. The Plan. DOI's IRM Long-Range Plan includes its requirements for ADP, telecommunications, library and information services, paperwork management, and data administration. The IRM plan:

- Encompasses the major goals and objectives considered critical to accomplish the information-related missions and programs of DOI;

- Offers the potential for significant IRM benefits to bureaus and offices;

- o Affords opportunities for application of information and technology resources to reduce cost and increase productivity; and,

- o Provides the mechanism for implementing management improvements resulting from Reform 88 type efforts.

DOI's IRM program is directed at increasing the Department's effectiveness in accomplishing its missions through the integrated management of resources devoted to handling information. Nine long-range IRM goals have been developed to focus the activities of the IRM program. The plan describes the overall IRM goals and supporting objectives to be achieved in improving DOI's information resources. Projects to achieve the goals and objectives are also described.

c. Performance Against the Criteria. While DOI's long-range plan has been endorsed by the Agency's top management, it appears that greater top management involvement, to include the Assistant Secretaries, in monitoring implementation and updating of the plan should occur. This would assure that middle management would be committed to implementing the plan and assigning required resources to planned projects.

DOI's plan needs to improve the linkages between the Department's missions and its IRM goals. Each subordinate organization should then state its missions and tie them back to the Department's missions. The IRM goals should reflect the programmatic direction of the Agency and relate to the Department's mission(s) supported.

The DOI planning process includes a thorough assessment of the current environment. A detailed technical forecast is presented for each of the specific disciplines which comprises the Department's plan. Also included is a discussion of the policies, laws, and regulations relating to Information Resources Management.

In the FY 1984-1988 update to the plan, DOI instituted a five-Year ADP and Telecommunications Acquisition Plan. This document presents a comprehensive list of planned acquisitions. DOI uses this document to determine similar equipment and services required by the bureaus. These common needs represent potential areas where joint acquisitions may be cost effective or resources sharing may be beneficial. They also point to the prime areas where technology standards may be needed to facilitate resources sharing and the sharing of information processed or communicated through these resources. DOI headquarters managers and top bureau officials are using the acquisition plan as a basis for detailed management reviews of bureau specific acquisition plans and to assess the effectiveness of each bureau's acquisition management/planning process.

In the future, DOI plans to use the bureau acquisition plans as a primary basis for approval instead of requiring submission and approval of individual requisitions.

The IRM planning process has been firmly established at the Department of the Interior. DOI personnel recognize that the plan and the planning process may need additional fine-tuning and are prepared to institute appropriate changes as necessary.

5. DEPARTMENT OF JUSTICE

The Department of Justice is the Nation's largest law firm and serves as counsel for executive branch agencies. The Department represents the agencies by defending them in civil suits, by enforcing the law in the public interest, and by playing a significant role in protecting citizens through its efforts for effective law enforcement, crime prevention, crime detection, and prosecution and rehabilitation of offenders. The Department looks to the Attorney General and the President of the United States for guidance and leadership in the area of law enforcement. In addition, the Department allocates substantial resources to the resolution of civil cases and matters. Justice has a budget of $3.3 billion for FY 1984 and employes 58,200 persons. There is a decentralized management style at the Department. The budget formulation process is centralized; however, budget execution is decentralized.

a. Planning Approach. The Automated Information System (AIS) Plan was developed by the Justice Management Division (JMD) between the fall of 1982 and the summer of 1983. The planning methodology was developed during FY 1982 by the Office of Information Technology (OIT), the systems component of the JMD. It's purpose was to provide a planning process, for use by every component of the Department, that would ensure that systems development and implementation took into account the entire organization's automated systems requirements. It's intent was to identify systems integration needs and to ensure that, in an area where technology is advancing rapidly, the best technological alternative was identified and utilized to meet all system requirements.

The Assistant Attorney General for Administration convened a Planning Task Group composed of the senior leadership of the Division. This group met one full day a week during the seven months the plan was being prepared. Their task was to step through the AIS methodology. The group addressed what the Division role is, what its responsibilities are, and what they should be. They worked through issues arising from JMD's goals and objectives, where its performance is satisfactory, where it needs to improve and how it should function in the years to come. Alternatives were discussed, options questioned, and ultimately, decisions reached.

While developing this plan, the senior leadership of JMD identified several major factors that gave direction to the shaping of alternatives. These factors were: (1) JMD is both a central control and a service organization; (2) personnel growth in the Division will be small in the coming years; (3) oversight agencies' corporate data requirements will require more data and data analysis; (4) many JMD systems are very old and need upgrading or replacement; (5) a number of non-automated activities could be more efficiently performed using new technology; and, (6) many functions are related to each other in intrinsic ways.

The group discussed technical alternatives. The goals of the organization were joined with the potential technological solutions and a general direction for meeting information requirements was agreed upon.

Once the general direction was chosen a tactical planning subgroup was created to define projects, establish timeframes, and develop integration requirements. The tactical planning subgroup met full-time for three months. It consisted of one assistant director from each of five staff offices. This subgroup developed specific recommendations with regard to project prioritization and project integration.

A series of 29 discrete projects were developed and organized into the four general areas of financial systems, human resources systems, administrative systems, and legal research and management control systems. Careful attention was paid to prioritizing the projects over the plan's five-year term and to insuring that the data needs of each system were developed in concert with the others. The planning process concluded with the definition of the organizations resource requirements and life cycle costs.

b. The Plan. The JMD-AIS plan covers a five-year period, from FY 1983 through FY 1987. A strategic plan and tactical plan together comprise the complete JMD-AIS plan.

The strategic plan is a comprehensive statement of purpose and represents the direction toward which the JMD will devote its efforts and direct its resources to effectively accomplish its mission. The results of the strategic plan is the identification of more than 25 major objectives. These objectives will require the introduction of new systems or improvements to existing systems.

The tactical plan provides the pathway to improve and expand the use of automated information systems by JMD. It focuses specifically on translating the objectives defined

in the strategic plan into automated systems projects and estimating the work effort and the cost associated with implementing those projects.

c. Performance Against the Criteria. The initial step used by JMD in developing the AIS plan involved the formulation of its mission statements. These statements reflect the principal purpose and functions of the organization. The mission statements provided the foundation upon which all subsequent planning activities were based. Program goals were developed that focused upon the unique missions, responsibilities, and priorities. For each component organization, mission statements were presented and supported by specific goals to be achieved.

A thorough environmental analysis and technical assessment enabled JMD to identify and assess the impact of the internal and external factors which affect the organization. The products of the environmental analysis and the technology assessment defined the operating and planning environments and were used to determine effective methods for meeting JMD's information requirements.

The initial plan developed by the Department was a pilot; only one division was covered to test the newly created planning methodology. This permitted the methodology to be fine tuned in order to better satisfy the agency's planning requirements. The Justice Management Division has developed the Automated Information Systems Planning Methodology Guidelines to assist other divisions in formulating their AIS plans.

The AIS planning process identified both technical and programmatic objectives. The programmatic objectives are explicit statements of program tasks that enhance the management, administration, and effectiveness of many of the technical objectives. Organizational responsibility was also designated for each objective.

The tactical plans developed as part of the AIS provide a blueprint for how the strategic plan will be implemented. The tactical plans translated the objectives defined in the strategic plan into automated systems projects and estimated the work effort and the costs associated with implementing those projects.

Justice needs to include the re-evaluation of existing activities during their planning process. Currently, on-going activities are included in the plan only if there is a planned change. It is important that all activities be reviewed during the planning process to ensure that the entire organization's information resources requirements are effectively and efficiently being met.

6. SOCIAL SECURITY ADMINISTRATION

The Social Security Administration (SSA) is part of the Department of Health and Human Services (HHS). SSA pays monthly benefits to over 36 million people. Each year SSA issues approximately 10 million new social security cards. The posting of 380 million wage items reported by employers to update individuals earnings records maintained by SSA is an annual requirement. SSA receives and processes 7.5 million new claim applications each year and paid program benefits to more than 50 million beneficiaries in FY 1982.

SSA employs more than 80,000 people, nearly 40,000 of whom are engaged in the claims activity both in the field and central office.

a. Planning Approach. SSA's System Modernization planning effort began in October 1981 and was completed in February 1982 with the publication of the System Modernization Plan. SSA estimates that implementation of its System Modernization Plan will cost approximately $479 million between FY 1982 and 1987.

The Strategic plan for the modernization of SSA systems takes into account the concerns of the Congress, the General Accounting Office, the General Services Administration, and also meets the long-range ADP goals of SSA. These goals are to:

- Restore excellence to the Social Security Administration Systems;
- Avoid potential disruption of client service through immediate improvements to critical system deficiencies;
- Improve client service by providing responsive, complete data at the District Office for programs affecting each person;
- Restore integrity and public confidence in the benefit payment system by assuring system accountability; auditability; and detection of potential fraud, abuse, and errors;
- Improve the quality and timeliness of data processing by eliminating backlogs, reducing the errors, and reducing extent of tape handling;
- Improve staff effectiveness by reducing turnover, increasing professional training, and improving the working environment;

- Improve productivity of data entry, case processing, operations, and software development through automation, improved work procedures, and management controls; and,

- Close the technology gap in systems architecture through the utilization of mass storage, database management, on-line data retrieval, and other modern ADP and telecommunications technologies.

The plan was completed in 90 days. The first 30 days were spent becoming familiar with the internal workings of SSA. The second 30 days were spent conceptualizing the plan to solve the problems encountered during the familiarization process. The third 30 days were spent developing the plan itself.

b. The Plan. The Systems Modernization Plan is a dynamic plan which covers a five-year period. The governing strategies for this plan emphasize modernization through incremental improvements; project continuity; use of proven state-of-the-art systems engineering technology and resources; building on the existing systems; and use of a single organizational body to plan, manage and control the modernization program.

The long-range ADP goals are projected to be met by the implementation of management strategies for the following major areas: software, hardware, planning and control, management, organization and staffing, and integrity. For each area there is a narrative description of the problems and deficiencies and a discussion of the planned resolution to these problems.

Three critical time periods were developed for the five-year plan:

- Level 1: (First 18 Months)- Complete immediate actions to improve SSA's ADP capability and to enable SSA to survive its current ADP crisis;

- Level 2: (Second 18 Months)- Having avoided disaster, implement changes to move SSA into a modern data processing environment, paving the way for final transition to the state-of-the-art operation of a redesigned benefit payment system; and,

- Level 3: (Last 24 Months)- Integrate final activities resulting in testing and certifying the redesigned system. This period brings together the completed increments of new application software, an integrated data base, a communications utility, distributed processing, and the final hardware configuration.

c. Performance Against the Criteria. Top Management was fully involved in the strategic planning process. The Commissioner made the overhaul of the SSA computer system his top priority. A planning group was formulated under his direct control.

The foundation of SSA's plan is stated in the governing strategies. These strategies provide the management principles and constraints upon which the plan is built to meet the Agency's long-range ADP goals. This strategic foundation allows the plan to endure changing fiscal or mission related situations.

The SSA plan is supported by tactical planning, which helps to translate the strategic plan into an effective operating plan. Without the tactical planning, SSA feels the strategic plan would be considered "blue sky."

SSA updated the five-year plan at the end of the first year. This update was somewhat different in format and incorporated changes based on management decisions and knowledge gained from a years experience with the plan. Concern has been expressed over the lack of linkages, or rationale supporting differences, between the original five-year plan and the first annual update. When the second update was initiated, SSA made an effort to include transition rationale to show continuity in the planning process.

The development of SSA's first strategy plan occurred in the middle of a budget cycle. This caused considerable funding restrictions. Due to the system's importance and the crisis atmosphere surrounding the Social Security System, money to implement was appropriated. It is important that future plans be integrated into the budget process to ensure that the resources required are available.

The modernization plan is significantly different from past SSA plans. Past efforts focused on buying more hardware and adding more people. The modernization plan looks at, and integrates improvements for, the entire system.

7. DEPARTMENT OF STATE

The Department of State is the chief spokesman and implementor of United States foreign policy abroad. This mission is fulfilled by representing the interests of the United States in foreign countries by providing support services to ambassadors, handling passport processing for citizens, and granting immigrant and non-immigrant visas to aliens. Additionally, the Department of State has various political, economic, and commercial functions. For example, the Department must manage international events ranging from terrorist attacks to state funerals. In the

economic and commercial areas, the Department performs such functions as economic analysis and modeling, particularly as it relates to international trade in commodities, and the promotion of U.S. products in overseas markets. The Department of State has a budget estimated at $2.7 billion for FY 1984 and employs approximately 24,400 persons.

Organizationally, the Department of State is decentralized with operating units worldwide. Data processing operations are also decentralized and distributed among the various embassies and other operational sites of the Department. Headquarters controls automatic data processing by placing procurement authority and the responsibility for ADP policy formulation in the Bureau of Administration. This office, a high-level post reporting to the Secretary of State, has broad administrative responsibilities including the automatic data processing function and its associated IRM functions.

The Department estimates the costs for achieving its automation program at $49.2 million.

a. Planning Approach. IRM planning at the Department of State began in its current form in 1978 with the production of the Department's first 10-year plan for ADP. It was updated in 1980 and again in September 1982. The plan addresses ADP, telecommunications, and office automation projects. The plan was developed by three senior managers in the Bureau of Administration who identified automation goals and established the priorities for accomplishing the Agency's automation program.

b. The Plan. The purpose of the plan is to identify the goals to be achieved by the Department's automation program through the end of the decade and to outline the approaches to be used in achieving these goals.

The goals for the Department's automation program are summarized under the following categories:

- o information processing
- o office automation
- o document handling
- o counsular functions
- o political functions
- o economic/commercial functions
- o resource management

For each category there is a narrative description of the problems, deficiencies, and needs currently existing at the Department. The plan is limited to automation projects that involve more than one domestic office or Foreign Service post.

c. Performance Against the Criteria. There is currently no formalized planning process in effect at the Department of State. Formalization of the planning process has suffered due to multiple personnel changes in top management positions.

There was limited top management involvement in the planning process. The Department has an Information Management Council to review information systems policy, plans, priorities, and projects to assure that these reflect adequately the needs of the entire Department. When proposed, the council was intended to be a broadly based group representing all elements of the Department; however, participation in the Information Management Council is now limited to Bureau of Administration personnel.

The Department needs to develop fundamental strategies and policies to govern its automation program. Current strategies and goals are developed and priorities set through conferencing of senior managers and such major users as the Bureau of Consular Affairs and the Comptroller. Many of these governing strategies are presented throughout the current plan; however, they should be formally documented in one place. Without this, a coordinated approach to automation is impossible.

The high degree of decentralization of automation in the Department has historically given the field units defacto control over the system design and development process for small projects. Even though the Bureau for Administration reviews procurement requests, the independent systems development direction of the Bureaus and Foreign Service posts has been difficult to overcome. Automation plans and strategies tend to develop from the bottom of the organization upward with little coordination. This results in some duplication throughout the organization.

A structured hierarchical planning process, that has top management support, needs to be established at the Department. The current plan identifies automation goals and objectives but fails to link them to agency missions.

V. TOOLS TO ASSIST MANAGERS WITH ADP AND TELECOMMUNICATIONS PLANNING

A. A PROVEN METHODOLOGY -- THE FEDERAL IRM PLANNING SUPPORT PROGRAM

The Federal IRM Planning Support Program (FPSP) in GSA's Office of Information Resources Management has developed a methodology that enables agencies to produce a viable strategic ADP and telecommunications plan. This methodology draws from (1) knowledge gained from past agency planning experiences; (2) helpful guidance contained in the General Accounting Office's "Questions Designed to Aid Managers and Auditors in Assessing the ADP Planning Process"; and, (3) research of the literature and variety of recommended planning approaches. It demonstrates that a comprehensive ADP and telecommunications plan can be developed, within a restrictive time schedule, following a structured, yet flexible process.

Fundamental to the methodology is recognition of five elements that pertain to an agency's information resources management(IRM) program: (1) program management; (2) information management; (3) hardware; (4) software; and (5) transmission services. These program elements are woven into the methodology and expand planning considerations beyond the hardware orientation of most existing plans. Information pertinent to each is captured and analyzed to ensure that the resulting plan presents information essential to a meaningful plan.

The methodology is also process oriented. It mandates top management involvement, reinforces the support role of ADP and telecommunications to programmatic performance, integrates resource requirements with budget requests, and instills commitment among functional managers to the course of action contained in the plan.

This planning methodology works best in an agency where strong management and decentralized operations exist. This means giving users the opportunity and responsibility for managing their individual information systems, within a framework of centrally developed policies, standards and guidelines. Other operating policies may come before the agency for review or consideration as it proceeds through the planning effort. The methodology encourages such a self-assessment and provides a vehicle for addressing these issues and generating top management support for their resolution.

Properly managed, the following provides the basic elements of the FPSP strategic information systems planning methodology that have proven to be successful.

1. **START-UP PERIOD**

a. DETERMINE PLANNING NEEDS

Prior to initiating the planning effort, existing agency plans and management systems are reviewed. The review identifies current strengths that can be reinforced, weaknesses that need to be corrected, or changes that need to be instituted. Planning needs can then be assured in terms of scope and content of the plan and structure of the process.

b. ESTABLISH PLANNING TASK FORCE

The agency head commissions a special six to eight person Task Force that will report directly to him/her, and whose charge is to develop the agency's Five-Year Strategic ADP and Telecommunications Plan. The project leader is, ideally, a member of the agency head's immediate staff, to reflect the high priority of this task and to ensure that agency views and perspectives are incorporated into the planning process. Other Task Force members are drawn from various program offices and include representatives from staffs involved in the management of ADP, office automation, and telecommunications programs. Interaction among the Task Force members will prove to be extremely valuable to the success of the project.

With use of the FPSP methodology, the time for the completion of the Task Force can be as little as 90 days. To emphasize the priority of the effort and to retain extensive top management interest and involvement, it is important to keep short but reasonable timeframes, depending upon agency size and complexity.

c. DESIGNATE REVIEW COMMITTEE

At the same time, a Review Committee is established, comprised of key agency officials charged with responsibilities that relate to managing the ADP and telecommunications program and the agency's management systems. The purpose of this committee is to lend viability and integrity to the planning effort and to generate their support for the plan during its various stages of development.

2. **PLAN PREPARATION STAGE**

a. DETERMINE SCOPE OF PLANNING EFFORT

The Task Force defines explicitly the scope of the planning activity, considering timeframes, tasks to be included, and IRM and Paperwork Reduction Act implications. Building from the FPSP recommended outline, they then compose a draft plan outline accommodating individual needs or circumstances of the agency that specifies the fundamental plan content and structure. In addition to addressing what will be included, it is important to note what is not to be included, and considered outside the scope of the planning effort. If an agreement cannot be reached on given items, they are brought to the attention of the Review Committee or, if necessary, the agency head for decision.

b. DEVELOP INITIAL WORK ASSIGNMENTS

The Task Force now faces the tasks that lay ahead. They identify the basic objectives of the plan, prepare to manage the process that the program offices will use to develop their individual plans, and prepare the integrated agency-wide plan. This involves:

- Refining the planning methodology and tools;
- Documenting the fundamental policies and strategies which will govern the agency's ADP and telecommunications program;
- Ensuring designation of a single representative for each major ADP and telecommunications user organization responsible for preparation of its individual plan;
- Assisting each representative with the planning methodology, and providing technical advice in preparing the individual plans;
- Briefing the Review Committee at suitable points in the development cycle on status and content of the agency plan;
- Assembling the input from each office; and,
- Developing the Five-Year ADP and Telecommunications Strategic Plan for the agency.

The task force assigns an individual member to each major program office to establish open communications. The planning representative ensures a common understanding of the questionnaire and governing strategies, clarifies instructions and corrects misunderstandings, assists in the adoption of user-oriented planning within the program offices, and acquires concise knowledge of individual plans.

Also, individual Task Force members are assigned responsibilities for:

- o Analysis, from an agency-wide perspective, of the IRM program elements;
- o Review and editing of the final plan, its form, design, structure and content;
- o Analysis and identification of duplicative activities; and,
- o Preparation for the packaging and printing of the completed product.

Forms contained in the planning guide issued at the end of this phase are the primary data collection vehicle for the Task Force. When completed, they should be carefully reviewed against the outline to verify that adequate support data will be captured.

c. REFINE PLAN OUTLINE

The Task Force refines the draft outline of what the final planning document will contain. This process serves to identify the main areas of concern and necessary information needs.

A draft table of contents recommended by the FPSP is provided in Exhibit 5.

d. DOCUMENT AGENCY MISSION AND PROGRAM OBJECTIVES

The Task Force reviews the mission(s) and program objectives of the Agency and documents them in a concise manner that can be used as a foundation for easy reference in the individual plans developed by program offices. This is necessary because the planning strategy is concerned with the programmatic as well as technological future of the entire organization.

e. CONFIRM AGENCY POLICY REGARDING OWNERSHIP OF INFORMATION SYSTEMS

An important policy that all government agencies should adopt is one that decentralizes, wherever possible, operational and functional responsibilities for ADP and telecommunications systems to the users of those systems. Program managers are responsible for making programmatic decisions based upon the information produced by their support systems. It follows that those program managers must assume responsibility for their information systems, defining their requirements and allocating adequate

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personnel and financial resources to meet them. Therefore, the agency Five-year Strategic Plan must be based upon the plans prepared by the responsible program offices.

f. CONFIRM ADP AND TELECOMMUNICATIONS STRATEGIES/POLICIES

Development of a comprehensive ADP and telecommunications plan requires consideration of various elements of the agency's IRM program. The Task Force should tailor them into appropriate elements for structuring their ADP and telecommunications program and planning effort.

Those developed by the Federal IRM Planning Support Program are:

- Program Management - the overall management and control of information resources management activities;
- Information Management - the overall management and control of the agency's investment in information, including identification and sharing of management information needs; standardization, control and integrity of data stored or manipulated; statistical and records management activities; and the privacy of records and freedom of information;
- Hardware - the ongoing operation, enhancement, modification, addition, removal or maintenance of equipment supporting ADP and telecommunications applications;
- Software - the acquisition, development, ongoing operation, enhancement, modification, conversion or maintenance of computer programs; and,
- Transmission Services - the acquisition, development, ongoing operation, enhancement, modification, or maintenance of the means of transmitting information between locations.

These elements specify agency management policy, reinforce the policy of system ownership and provide a structure for program offices to develop their own individual ADP and telecommunications plans.

g. ASSURE ISSUANCE OF POLICY DOCUMENTS

It is particularly critical that a common understanding of responsibilities and objectives are firmly established for the agency's ADP and telecommunications program. Documents to establish the policy foundation that will guide the Task Force and assist program officials in identifying areas in need of improvement are:

- The agency mission(s) and objectives statements;
- The governing strategies for ADP and telecommunications; and,
- The "system ownership" document, specifying ADP and telecommunications roles and responsibilities.

These documents are coordinated with the Review Committee for their review and endorsement, incorporated into the planning guidance for program offices, and then issued to agency personnel through the directives system.

h. **DETERMINE GENERAL PLANNING ASSUMPTIONS AND CONSTRAINTS**

Throughout the planning process, assumptions will, by necessity, be made. Documenting these assumptions, as well as any constraints placed on the plan permits appropriate modifications when planning assumptions and constraints change. Although each program office will make individual assumptions as they develop their plans, some planning constraints, such as projected staffing and funding limitations, are general in nature and, to ensure consistency among plans, are applied throughout the agency. The Task Force identifies and documents these constraints and incorporates them into the planning guidance for program offices.

i. **DEVELOP FORMS AND INSTRUCTIONS**

The Task Force is now ready to develop forms that will be used by user representatives in preparing their ADP and telecommunications plans. Following the general outline for the plan, the forms ask information of program managers on all aspects of their information systems programs. Within the context of their overall program mission, as reflected in Exhibit 6 they are able to evaluate their current systems environment, project future processing requirements, and identify their plans for meeting them. Itemized activities include only those efforts which program managers fully intend to accomplish within known resource constraints.

Accompanying instructions are developed to inform the users of the purpose of the forms and to define the data elements requested. The Task Force should provide the program officers with as much supporting information as possible to facilitate users in completing the forms.

Identification of ADP and telecommunications personnel and costs is likely to be difficult. Inconsistent definitions probably have been used in previous years for identifying classifications and categories of personnel whose full or partial salary costs should be considered as ADP and telecommunications costs. A further difficulty,

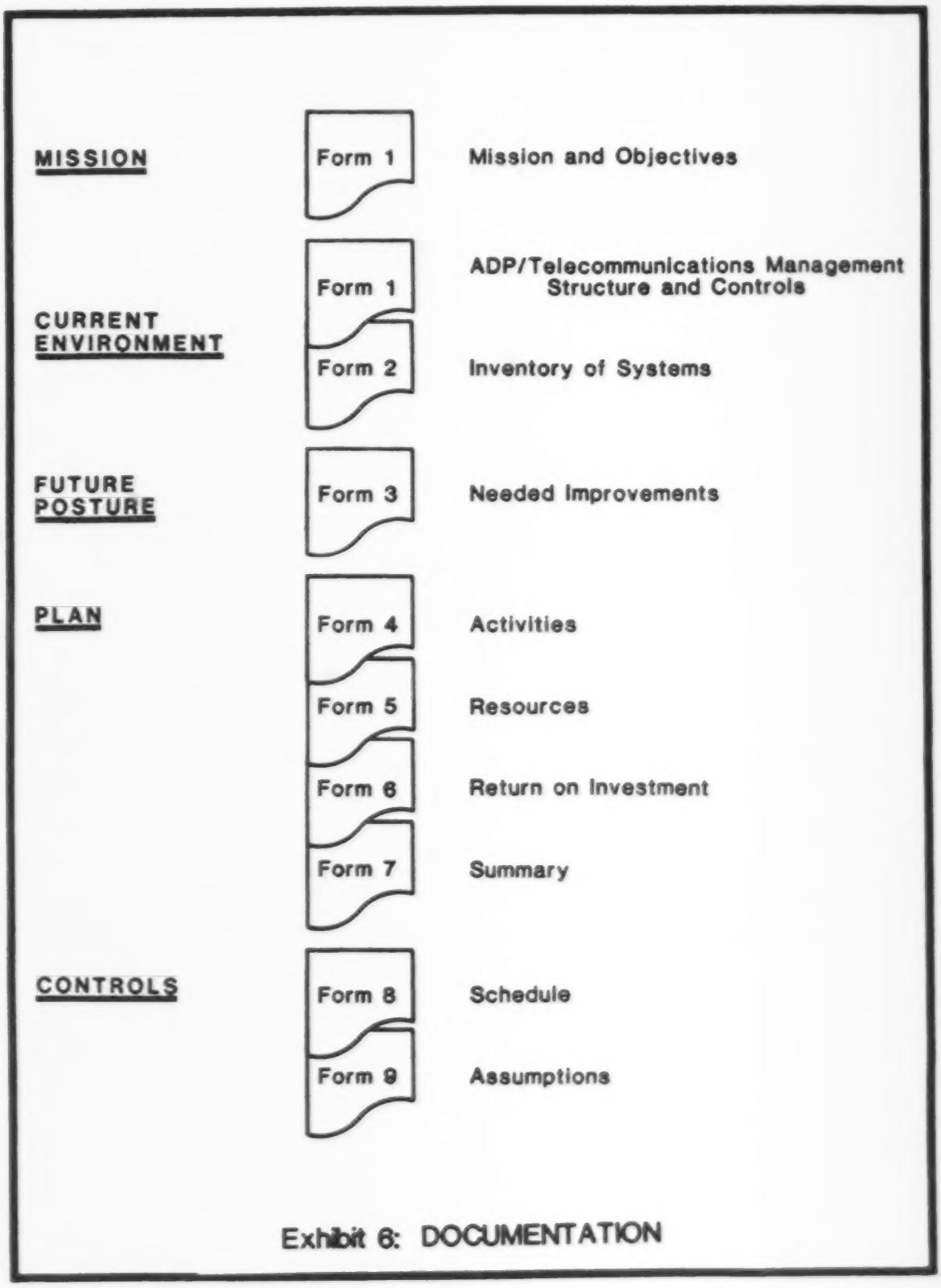

Exhibit 6: DOCUMENTATION

encountered as a result of placing functional responsibilities with ADP and telecommunications users, involves the assessment of costs for centralized user support (hardware, operation, and software development) at the user activity level. The Task Force, in preparing resource requirements forms and instructions, formalizes the definition of cost categories in a fashion that will lend itself to the agency's budget cost categories and will be consistent with OMB guidelines (OMB Circulars A-121, "Cost Accounting, Cost Recovery and Interagency Sharing of Data Processing Facilities," and A-11, "Preparation and Submission of Budget Estimates" Exhibit 43, "Data on Acquisition, Operation, and Use of Information Technology Systems".)

j. PREPARE ORDER FOR ESTABLISHING EXECUTIVE STEERING COMMITTEE

Since the Task Force and Review Committee are temporary groups, an Executive Steering Committee for Information Resources Management, if not already in existence, should be established during this timeframe. As a permanent advisory and policy setting body, the Committee's responsibilities, in relation to the planning process, will include review and endorsement of the Five-Year Strategic Plan prior to agency head approval and a commitment to implementation of the plan. This body is composed of key agency officials, serving in top program and management positions.

k. ISSUE PLANNING CALL

This phase culminates in the issuance, by the Task Force, of the agency planning guide. At a minimum, this package contains the forms, and their instructions, the draft governing strategies and "system ownership" document, and the agency mission and objectives statements. A covering memorandum to this package, signed by the agency head, is directed to each user representative and bureau head. The memorandum expresses the need for active commenting by the Review Committee as well as the organizations subordinate to the bureau level. The planning effort moves into the next phase, concentrating activity into development by subordinate organizations of their ADP and telecommunications plans.

3. PLAN DEVELOPMENT - PROGRAM OFFICES

a. BRIEF USER REPRESENTATIVES

To familiarize program offices with the planning guide, a training workshop for all user representatives is conducted. The audience will have had sufficient time to review the guide and will come prepared with questions and comments regarding specific items. Issues relating to

"cost elements" should be thoroughly addressed so that a consistent approach will be used in preparing the necessary information. At this point introductions are made between individual Task Force members and their assigned program offices.

b. DEVELOP OFFICE PLANS

The user representative with the assistance of the designated Task Force member is ready to:

- o Interview subordinate Program Directors;
- o Complete, for each Program Director, the prescribed forms;
- o Verify the accuracy of the data collected with the Program Directors;
- o Consolidate the information;
- o Prepare a consolidate version of the planning guide; and,
- o Submit the completed plan to the Task Force.

c. DRAFT BACKGROUND PORTIONS OF PLAN

Concurrently Task Force members are preparing a first draft of the background portion of the plan. This should include:

- o Background, purpose and objectives of the plan;
- o An agency mission and organization overview; and,
- o A description of the current ADP and telecommunications environment.

4. PLAN DEVELOPMENT - AGENCY

a. REVIEW AND SUMMARIZE OFFICE PLANS

The planning effort now progresses to the phase of integrating the individual bureau plans into a comprehensive agency-wide plan. The Task Force reviews all bureau plans and prepares executive summaries describing each bureau plan. This is an important step, not only in encapsulating various data in a short and effective overview, but also in certifying that the Task Force members understand and have captured the import of the planning guide responses. Bureau plans are reviewed in terms of completeness and cohesiveness as well as content for input into the agency plan. The executive summaries

are included in the Executive Summary for the agency plan and as a cover sheet for each program office planning submission contained in Volume II.

b. **BRIEF REVIEW COMMITTEE**

The Task Force briefs the Review Committee on general progress and content of the plan. The Committee is provided with a draft of the background information to the plan, the executive summaries, and the cost analyses, tables and charts prepared by the Task Force to graphically portray the existing ADP and telecommunications environment. The Review Committee gives their guidance and approval to the existing approach.

c. **INTEGRATE OFFICES' RESPONSES**

The Task Force reviews the bureau plans and determines if duplications exist in any areas. Conflicts are resolved with user representatives and modifications agreed on.

d. **PERFORM AGENCY-WIDE ANALYSIS OF PROGRAM ELEMENTS**

Each of the five IRM program elements is assigned to a member of the Task Force for a comprehensive examination of all related bureau submissions, and preparation of the appropriate segment of the agency plan. Based on the analyses, it is decided from an agency-wide perspective what the long-range objectives should be for each and strategy for achieving them.

e. **DEVELOP DRAFT OF AGENCY PLAN**

The Task Force is now prepared to piece together an initial draft of the plan. This consists of a catalog describing all operating ADP and telecommunications systems within the agency; bureau plans compilation; the overall agency plan; and an executive summary with a Foreword to be signed by the agency head. Concurrently, arrangements are made for editorial review and printing of the plan.

When the initial draft is completed the Task Force forwards the plan to the Review Committee for their reactions and comments. A quick turn-around here is required. Suggested changes are then incorporated and a final draft is prepared and edited.

Also, at this time, the Task Force develops a letter for transmittal to the agency head discussing any unresolved issues or problems, and stating that a copy of the draft plan is being submitted to the Executive Steering Committee for their endorsement. A copy of this letter is also provided to the Committee for its consideration.

f. **DELIVER DRAFT PLAN TO AGENCY HEAD AND STEERING COMMITTEE**

At the end of this phase, the Team Leader delivers the draft plan to these recipients for review so that needed changes can be reflected prior to final printing.

g. **CONCUR ON PLAN AND SUBMIT TO AGENCY HEAD**

The Executive Steering Committee concurs on the final planning document and submits it to the agency head for approval. The agency head indicates formal approval and adoption of the plan by signing the Foreword in the executive summary and permitting distribution of the plan.

5. **INSTITUTIONALIZATION OF PROCESS**

a. **IMPLEMENT PLAN**

The official plan is now distributed to all program managers for their implementation. Management procedures are reviewed to confirm that a format exists for reporting progress against the plan and for reflecting plan performance as an integral facet of overall program performance evaluation.

b. **INSTITUTIONALIZE THE PROCESS**

The planning methodology is now an ongoing activity, with scheduled annual updates timed in conjunction with the annual budget process. This annual review of the plan is not intended to be a perfunctory modification of a few words or statements, but rather a fundamental agency activity, reflecting changing approaches to the future, with appropriate reviews and reconciliation at each bureau level. Institutionalizing the process ensures that the strategic ADP and telecommunications plan continues to relate to actuality and to provide maximum support to the programmatic direction of the agency.

B. AGENCY SELF-ASSESSMENT MECHANISM

The following checklist (Exhibit 7) will be helpful for evaluating the planning process, the plan itself, and the plan implementation and maintenance processes. It reinforces the elements presented for effective ADP and telecommunications planning and follows a planning methodology used successfully by other agencies in managing their information resources. More importantly, the checklist can help identify existing weaknesses or potential problem areas, thereby improving subsequent planning efforts.

The checklist should be tailored by each agency. Items can, be added or deleted to accommodate specific agency requirements. Yet as presented, it ensures appropriate consideration of the fundamental elements for successful strategic ADP and telecommunications planning.

Part I of the checklist identifies considerations for plan development. Five key issues are addressed with detailed questions provided to assist one in assessing the plan development process. Emphasis is placed on involvement in the planning process by all levels of management using a top-down approach for specifying policy and planning structure and a bottom-up approach for identifying user requirements.

Part II of the checklist addresses what elements of the ADP and telecommunications plan should contain. The structure of the checklist corresponds to the general plan outline necessary for the development of a complete ADP and telecommunications plan.

The final section of the checklist, Part III, identifies factors influencing plan implementation, specifies policies and procedures necessary for proper execution of the plan, and addresses plan maintenance considerations.

Although this checklist relates to strategic agency-wide ADP and telecommunications planning, it can also be used to develop supportive tactical and operational plans.

SELF-ASSESSMENT CHECKLIST

A CRITIQUE FOR EVALUATING AN ADP/TELECOMMUNICATIONS PLAN AND PLAN PROCESS

PART I: PLAN DEVELOPMENT PROCESS

		CONSIDERED YES	NO	N/A
TOP MANAGEMENT SUPPORT AND INVOLVEMENT	- Is the programmatic direction of agency properly reflected and documented?	☐	☐	☐
	- Are ADP and telecommunication directions supportive of agency programs?	☐	☐	☐
	- Has endorsement of the planning effort and commitment been adequately generated at all appropriate levels within the organization by agency head or executive steering committee?	☐	☐	☐
HIERARCHICAL AND INTEGRAL PLANNING	- Have individual plans at subordinate levels within the organization been formulated?	☐	☐	☐
	- Do these subordinate plans represent plans of action for meeting the ADP and telecommunications requirements of the subordinate organization?	☐	☐	☐
	- Does the agency-wide plan build upon and integrate subordinate organization plans into a meaningful plan of action for the agency?	☐	☐	☐
STRUCTURED PROCESS	- Have definitions been provided so that like information can be reflected in the plan?	☐	☐	☐
	- Has the information that is needed and how it is to be displayed been clearly identified?	☐	☐	☐
	- Have policy directions and planning assumptions been provided to assist subordinate organizations in their individual plan development efforts?	☐	☐	☐
	- Have agency organizational mission and objective statements been clearly specified?	☐	☐	☐

Exhibit 7: SELF-ASSESSMENT CHECKLIST

		CONSIDERED YES	NO	N/A
ROLE ASSIGNMENT AND ACCEPTANCE	- Have roles and responsibilities related to the management and operations of the ADP and telecommunications program been identified and documented?	☐	☐	☐
	- Have roles and responsibilities been identified for:			
	- managers responsible for accomplishing activities?	☐	☐	☐
	- personnel responsible for assigning resources?	☐	☐	☐
	- personnel responsible for plan implementation?	☐	☐	☐
	- Have responsibilities been assigned?	☐	☐	☐
	- Have planning roles and responsibilities been formally documented?	☐	☐	☐
INTEGRATION WITH THE BUDGET	- Are resource requirements in the initial years of the plan consistent with known resource constraints?	☐	☐	☐
	- Will the planning process provide sufficient information upon which to build future budget submissions?	☐	☐	☐
	- Are resource requirements reflective of the activities identified in the plan?	☐	☐	☐

Exhibit 7: SELF-ASSESSMENT CHECKLIST

PART II: PLAN CONTENT

		IN PLAN Y	N	PUT	N/A
MISSION IDENTIFICATION	- Have mission statements for the agency been clearly identified?	☐	☐	☐	☐
	- Have mission statements for subordinate organizations been identified and directly linked to the agency missions supported?	☐	☐	☐	☐
STATEMENT OF PROGRAM OBJECTIVES	- Have overall program objectives for the agency been identified and linked to agency mission statements?	☐	☐	☐	☐
	- Have program objective statements for subordinate organizations been identified and linked to agency mission statements?	☐	☐	☐	☐
	- Are the program objective statements quantifiable in terms of: - scope? - time? - performance measurements?	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
	- Have program objective statements been identified for that subordinate organization which provides ADP and telecommunication support to the rest of the organization?	☐	☐	☐	☐
	- Are the program objectives for the ADP and telecommunications support office clearly defined ?	☐	☐	☐	☐
ESSENTIAL AND CORPORATE INFORMATION REQUIREMENTS	- Have essential information requirements to achieve program objectives been identified?	☐	☐	☐	☐
	- Are these information needs linked to agency and program objectives?	☐	☐	☐	☐
	- Have corporate information requirements been incorporated into the plan so that requests for corporate information can be obtained directly from the plan rather than compiled separately?	☐	☐	☐	☐

Exhibit 7: SELF-ASSESSMENT CHECKLIST

		IN PLAN Y	N	PUT	N/A
ADP AND TELECOMMUNICATIONS STRATEGIES/ POLICIES	- Have fundamental principles that govern the agency's ADP and telecommunications program been identified?	☐	☐	☐	☐
	- Are the ADP and telecommunications program objectives and activities in conformance with these principles, policies, and strategies?	☐	☐	☐	☐
	Do the ADP and telecommunications policies include:				
	- management concepts that can be applied?	☐	☐	☐	☐
	- technical direction that can be followed?	☐	☐	☐	☐
	- guidance on prioritization of activities?	☐	☐	☐	☐
	- guidance on resource expenditures?	☐	☐	☐	☐
	- Do the governing strategies and policies adequately reflect management considerations based on the current environment and the direction the agency plans to pursue to take advantage of targets of opportunity?	☐	☐	☐	☐

Exhibit 7: SELF-ASSESSMENT CHECKLIST

		IN PLAN Y	N	PUT	N/A
ASSESSMENT OF CURRENT ENVIRONMENT	- Does the assessment of current environment include: - identification of how information needs are currently being met?	☐	☐	☐	☐
	- identification of anticipated policies that may influence planned courses of action?	☐	☐	☐	☐
	- identification of compliance with agency-external Federal rules, regulations, and policies?	☐	☐	☐	☐
	- identification of projected technological trends affecting ADP and telecommunications?	☐	☐	☐	☐
	- evaluation of past performance vs. planned performance?	☐	☐	☐	☐
	- Is the performance in meeting information needs identified in terms of effectiveness and efficiency?	☐	☐	☐	☐
	- Is an inventory of existing application systems included in the plan?	☐	☐	☐	☐
ADP AND TELECOMMUNICATIONS ACTIVITIES	- Are activities presented in the plan with direct links to information requirements?	☐	☐	☐	☐
	- Are the activities for the subordinate organization that provides ADP and telecommunications support directly linked to program objectives for that subordinate organization?	☐	☐	☐	☐
	- Have priorities been established for activities and have the activities been ranked based upon priorities?	☐	☐	☐	☐
	- Are the relationships among activities properly identified?	☐	☐	☐	☐
	- Are activities integrated so that solutions to problems represent optimal solutions rather than independent actions?	☐	☐	☐	☐
	- Has organizational responsibility for the accomplishment of individual activities been identified?	☐	☐	☐	☐

Exhibit 7: SELF-ASSESSMENT CHECKLIST

		IN PLAN Y	N	PUT	N/A
OBJECTIVES OF ADP AND TELECOMMUNICATIONS ACTIVITIES	- Have the objectives for each activity been identified?	☐	☐	☐	☐
	- Are the objectives for each activity:	☐	☐	☐	☐
	- limited in scope?	☐	☐	☐	☐
	- specific in identifying time frames for accomplishment of the activity and associated milestones?	☐	☐	☐	☐
	- inclusive of quantitative criteria for determining successful achievement?	☐	☐	☐	☐
RESOURCES REQUIRED	- Have the resources required to support each activity been fully identified?	☐	☐	☐	☐
	- Do these resources include:	☐	☐	☐	☐
	- personnel and associated costs?	☐	☐	☐	☐
	- equipment support and associated operating costs?	☐	☐	☐	☐
	- contractor support costs?	☐	☐	☐	☐
	- Have resource requirements been identified for each fiscal year?	☐	☐	☐	☐
	- Have resource requirements been specified in categories necessary to supply corporate information?	☐	☐	☐	☐
	- Do total resources identified for all activities reflect the total resources necessary to provide ADP and telecommunications support throughout the planning period?	☐	☐	☐	☐
	- Has return on investment been estimated for each activity?	☐	☐	☐	☐
SCHEDULE	- Have major milestones for each activity been identified?	☐	☐	☐	☐
	- Are dates specified by fiscal year?	☐	☐	☐	☐
	- Are schedules for individual activities integrated to portray planned activities for the agency as a whole during the planning period?	☐	☐	☐	☐
	- Are interdependencies among the activities reflected?	☐	☐	☐	☐

Exhibit 7: SELF ASSESSMENT CHECKLIST

		IN PLAN Y	N	PUT	N/A
GENERAL CONSIDERATIONS	- Is the plan:	☐	☐	☐	☐
	- technically feasible?	☐	☐	☐	☐
	- economically feasible?	☐	☐	☐	☐
	- politically feasible?	☐	☐	☐	☐
	- Is the plan understandable to:	☐	☐	☐	☐
	- personnel responsible for approving its implementation?	☐	☐	☐	☐
	- personnel responsible for its execution?	☐	☐	☐	☐
	- personnel responsible for providing resources?	☐	☐	☐	☐
	- personnel that are directly and indirectly affected?	☐	☐	☐	☐
	- Is the plan easy to read by being:	☐	☐	☐	☐
	- short?	☐	☐	☐	☐
	- concise?	☐	☐	☐	☐
	- in the proper format?	☐	☐	☐	☐
	- in a language appropriate to the readership?	☐	☐	☐	☐
	- Is the planning horizon appropriate?	☐	☐	☐	☐
	- Is the plan legal in terms of:	☐	☐	☐	☐
	- agency policies and procedures?	☐	☐	☐	☐
	- Federal regulations and other Government-wide policies?	☐	☐	☐	☐
	- authorities of the office responsible for its approval and implementation?	☐	☐	☐	☐
	- Has active participation been received from:	☐	☐	☐	☐
	- top management?	☐	☐	☐	☐
	- managers of subordinate organizations?	☐	☐	☐	☐
	- users?	☐	☐	☐	☐
	- computer operations group?	☐	☐	☐	☐

Exhibit 7: SELF-ASSESSMENT CHECKLIST

PART III: PLAN IMPLEMENTATION AND MAINTENANCE PROCESS

		CONSIDERED YES	NO	N/A
INFLUENCES AFFECTING PLAN IMPLEMENTATION	- Has commitment for performance against the plan been accepted by all subordinate organizations responsible for plan implementation?	☐	☐	☐
	- Have the impact and effect of plan implementation been identified?	☐	☐	☐
	- Has the plan been formally approved and issued by the agency head or executive steering committee?	☐	☐	☐
	- Has the plan been realistically assessed in terms of the agency's capability to carry out the planned activities within the specified time?	☐	☐	☐
IMPLEMENTATION POLICIES AND PROCEDURES	- Have policies and procedures been identified to ensure that the plan will be properly executed?	☐	☐	☐
	- Are the milestones for planned activities clearly identified so that progress against the plan can be measured?	☐	☐	☐
	- Does the plan reflect standards for successful performance?	☐	☐	☐
	- Are roles and organizational responsibilities clearly assigned?	☐	☐	☐
	- Have qualified personnel been obtained to perform planned activities?	☐	☐	☐
	- Have procedures been established for monitoring performance against the plan?	☐	☐	☐
	- Have tactical plans of the subordinate organizations been prepared for implementation of each activity ?	☐	☐	☐
	- Have subordinate organizational plans been modified to reflect integrated efforts or ADP/telecommunications directions contained in the agency-wide plan?	☐	☐	☐
	- Are resources requirements accurately reflected in the agency budget?	☐	☐	☐

Exhibit 7: SELF-ASSESSMENT CHECKLIST

		CONSIDERED YES	NO	N/A
PLAN MAINTENANCE	- Have procedures been developed to permit necessary modifications to the plan?	☐	☐	☐
	- Do the procedures cover modifications to include changes to:	☐	☐	☐
	- resource commitments?	☐	☐	☐
	- schedules?	☐	☐	☐
	- responsibilities?	☐	☐	☐
	- program and activity objectives?	☐	☐	☐
	- Has the planning process been institutionalized within the agency to allow for yearly plan preparation?	☐	☐	☐
	- Have procedures been established for the proper approval of modifications to the plan?	☐	☐	☐

Exhibit 7: SELF-ASSESSMENT CHECKLIST

VI. MANAGEMENT IMPLICATIONS OF THE NEW TECHNOLOGIES: AN INTERIM REPORT

Computer and communications technologies are exhibiting three dominant trends which, taken together, have major implications for Federal ADP/Telecommunications managers as well as their "functional" or "program" counterparts. Those three trends are:

- o The continuing microprocessor revolution and end user computing;
- o The growing use of networks; and,
- o The increasing sophistication and usefulness of packaged software.

A. THE TECHNOLOGY TRENDS

Microprocessor technology has made the personal computer possible and it is the personal computer that is leading us into an entirely new ADP environment. It is almost impossible to grasp the impact that this technology has had and will continue to have, but one fact will serve to indicate the scope: personal computers are being accepted at a faster rate than was the telephone. Given concomitant trends in software and networking, its impact on the way we do business could easily approach if not exceed that of the telephone.

Software advances are driving hardware innovations. Microprocessor technology had been available for many years before it became a significant factor in the normal workplace. It was the appearance of software packages for spreadsheets that led to the present situation. As such advances as moving graphics and videotext enter the mass market, this trend is likely to continue. Such technologies offer instant information that is easily assimilated; they are qualitatively different from the stacks of computer printouts previously presented to exasperated policy makers.

Networking technologies and the advent of standardization are permitting more computers to communicate with other computers over varying distances and in increasingly sophisticated ways.

Taken together, these three technology trends have already led us from a state in which the central mainframe was dominant to one in which distributed processing is common place. They will continue to lead us to an environment of distributed resources. That environment must be managed.

1. END-USER COMPUTING

End-user computing is the relationship between people and technology in which individuals, located at their own work-stations, interact directly with the computer to process their own information. The concept of end-user computing has grown from one which envisioned people working at stand-alone stations, manipulating data for their own discrete uses, to that of many people, working at interconnected terminals, drawing on a store of common data, and adding to or changing that store.

This expanded concept includes not just data processing professionals, secretaries, and budget analysts, but also managers and professionals. Many analysts believe that by the 1990's, computer literacy will be indistinguishable from basic literacy. The notion that managers and professionals would not use a keyboard, taken for granted only a year or two ago, is daily contradicted by hundreds of thousands of managers who use their own work-stations for everything from simple word processing to sophisticated simulations.

This trend does not signal the end of the central data processing shop--some large "batch" runs will still be performed centrally and the central shop will still be the keeper of the institution-wide records that are available through networks. However, many of the functions of the ADP shop will be distributed through or supplemented by other units within the organization.

The impending ubiquity of end-user computing has important corollaries for both the functional managers and the data processing professionals. Among them are:

- Functional managers have more to lose than do ADP/MIS managers if operations get out of control due to the use of unverified procedures or data; and,

- ADP/MIS managers will find themselves dealing with increasingly sophisticated clients who will be (1) more understanding of and responsive to software development steps such as requirements analyses and (2) less tolerant of failures due to ineptitude and "stonewalling" in the interests of turf protection.

2. NETWORKS AND ARCHITECTURE

The new technologies have given us the ability to compose large systems out of multiple hardware components linked with kilobyte-per-second communications and distributed operating system software. The "backbone" of these systems is composed of the networks and architectures which are currently being standardized.

As aspects of the networks and their architectures become standardized, those aspects become relatively stable--relatively, because changes will continue to occur. These changes are likely to be evolutionary rather than explosive. However, the individual components of the system will continue to experience explosive innovation and their technology cycles (discussed below) will become increasingly shorter.

As in the case of end-user computing, the increasing use of networks has implications for both ADP/MIS managers and functional managers. Among them are:

- o ADP/MIS managers must distinguish between the architectural backbone of the system and its individual components.
- o In developing a system, it is essential to choose the backbone carefully--mistakes will be costly.
- o It is important to examine individual components for their potential impact on network selection and upgrade--expensive pieces of acquired gear could result in the implicit selection of an architecture with consequences well beyond the immediate decision.
- o If the organization makes the right decision concerning the network backbone,it may be possible to go through multiple replacements of nearly all the individual hardware components while preserving the basic architecture of the system and taking advantage of technological improvements; and,
- o Functional managers must take cognizance of the fact that their end-users will develop ad hoc networks which may extend beyond their own organization. To the non-ADP professional, "networking" is the term used for extensive interaction, for the purpose of information exchange, among people--wherever they are--with the same professional interests. The development of these ad hoc networks will have drastic implications, good and ill, for institutional databases.

3. SOFTWARE INVESTMENTS

The investment in existing software is a powerful counterforce to the acquisition of new technology. The costs of conversion can be prohibitive. However, studies of the cost of conversion often omit the offsetting costs of maintaining the old software.

Costs are associated with corrective, adaptive, and perfective maintenance. Conversion to a new system may significantly lower those costs, particularly if a tested software package is available. To get an idea of the costs associated with software maintenance, consider the following figures:

- In 1980, total software costs were estimated to be $2 billion; they are projected to be $8.1 billion in 1985 and $23.4 billion in 1990;

- GAO has found that 70% of total software costs are related to maintenance;

- Approximately 60% of maintenance costs are for perfective, 20% for adaptive, and 20% for corrective maintenance; and,

- DOD has testified that 64% of software errors originate in design as opposed to 36% in coding.

Simple extrapolations show that in 1980 the Federal Government spent about $0.8 billion for perfective maintenance, expected to rise to about $9.8 billion in 1990. Conversion to well-suited packages could save a substantial portion of that expense. In addition, if the DOD experience is representative of that of the Federal Government as a whole, we spent $200 million in 1980 to correct design errors, expected to rise to $2.1 billion in 1990. Conversion to tested packages could save a substantial portion of that. Those estimates argue that conversion may be less costly than commonly estimated. Maintenance costs should be reviewed during the annual budget process to determine when maintenance of an obsolete application system has crossed the cost threshold which justifies redesign.

Software investments may be divided into two categories: existing application systems and proposed systems.

A. Existing Software Application Systems

The strategies selected for existing software should also be divided into two categories: "stranded" software, which operates in a dead-end hardware architecture with no available compatible upgrade, and that which has available compatible upgrades. Both types may face obsolescence of the application system software design, but the solution begins at different departure points.

The issue in moving stranded software to a new hardware architecture is whether the conversation should be accomplished in one step or two. The software might have to be rewritten in either event. The question is whether the rewrite will be a "literal translation" to the new architecture, with later, evolutionary redesign or whether conversion will be done "cold turkey" in one step. In the first case, the converted system will have added capabilities which will gradually be turned into real capabilities. In the second case, the capabilities will be realized immediately.

The two-step approach is favored--in part because it permits elements of redesign to be tested individually and phased in as they are proven, and partly because of the trauma involved when users are presented with a totally new system. Retraining, in that case, is a major, costly consideration.

The Air Force, with its Phase IV base level logistics systems and the FAA with its flight control system have both opted for the two-step approach.

Occasionally, it is feasible to totally redesign a replacement software application system and operate it in parallel with the old system. In these cases, the question of phasing is less critical.

When a compatible upgrade is available, the software need not be rewritten. However, the evolutionary vs. "cold turkey" issue still remains and the argument still favors evolution. GSA recommends evolution of major applications in its FPMR Bulletin F-131 in which it states that first priority should be given to retaining the integrity of current systems. That is, agencies should engineer incremental improvements to be used as stepping stones to reach any desired software application enhancement. The Social Security Administration is following this approach.

B. Proposed Software Application Systems

As implied above, the preferred strategy for proposed software application systems is to use existing Government or commercial software application packages that meet the requirements with little or no modifications. Indeed, this is more than a "preferred" strategy: OMB Bulletin 83-18 requires that a search for such packages be made when independent administrative applications costing more than $2.5 million are being considered. However, such a search should be made even when that threshold has not been reached. Time-tested packages are worthwhile for all but the most trivial applications.

It should be noted that upward compatability is as important for proposed software applications as it is in the case of hardware. This is equally true for mainframe applications and personal computers. In all cases, it is prudent to investigate the upgrade plans of the competing vendors.

C. Software Issues for Microcomputers

The above discussion is specifically pertinent to the "backbone" data administration, but the points made are equally valid for end-user computing, i.e.

- The use of tested applications software packages can greatly reduce the cost of software maintenance; and,
- Conversion of both "stranded" and compatible software can be accomplished either through evolution or "cold turkey."

Apart from the obvious dissimularities due to the difference in scale between a central mainframe facility and an end-user work-station, the major issues in micro-software acquisition arise from the fact that the bulk of the end-users are out of the

main data processing stream and are unaware of the pitfalls that data processing professionals have, over time, learned to avoid. ICST has published three documents dealing with the issues from the microcomputer perspective: NBS SP 500-112, Selection of Microcomputer Systems, NBS SP 500-102 Microcomputers: A Review of Federal Agency Experiences, and NBS SP 500-110, Microcomputers: Introduction to Features and Uses. The publications take up topics such as the acquisition of applications software in order to minimize development and maintenance costs, the characterization of typical applications packages, system requirements and application integration, and the incorporation of microcomputers into larger computer networks. These (and several other ICST publications scheduled for release later this year) should be put in the hands of the functional managers as soon as they contemplate the acquisition of a micro.

One further related issue deals with the acquisition and use of proprietary software and software licenses. The purchase of licensed software permits it to be used only in accordance with the provisions of the purchase agreement. These provisions frequently address the confidentially of trade secrets and restrictions on the numbers and kinds of copies of the software and documentation that may be made and on which machines it may run. It is unclear, however, whether signing a license agreement is necessary to make it binding or whether even opening a package in which the agreement is visible is proof of agreement. It is of importance to agency management to know who is authorized to enter into such an agreement and the extent of liability incurred by the individual and the organization. Also in question is the extent to which the agency is required to make its people aware of the license terms.

An issue for the agency in formulating its policy is the set of legal implications of its contractual arrangements for software. Agencies advise their users that software must be legally obtained. However, implementation of the policy is difficult. The conflict arises when multiple users want to experiment with the software, but do not wish to invest the purchase price while experimenting. Several agencies have addressed a part of the problem with their demonstration facilities where legal copies of software are available for user experimentation and use. Another agency centrally procures software packages and provides support only for copies of the packages.

In conclusion, three dominant trends in computer and communications technologies are rapidly leading us into an environment characterized by distributed data resources and end-user computing. This implies that:

- Increased computer literacy and awareness of technical issues will bring non-technical personnel into the ADP planning and acquisition process;

- Decreasing technology cycles brought about by rapid innovation require that managers select a standard system "backbone" with sufficient versatility to permit multiple replacements of individual components;

- Software conversations to new hardware should be planned to permit a gradual phasing-in of new capabilities;

- Tested applications software packages should be selected over do-it-yourself programs whenever possible; and,

- When formulating ADP policy, agencies should consider the legal implications of their contractual arrangements for software.